XEROX

Xerox University Microfilms
Ann Arbor, Michigan 48106

WESTERN AMERICANA

Reproduced from the original in the collection of
THE UNIVERSITY OF ILLINOIS LIBRARIES

THE WEST:

FROM

THE CENSUS OF 1880,

A HISTORY OF

THE INDUSTRIAL, COMMERCIAL, SOCIAL, AND POLITICAL DEVELOPMENT OF THE STATES AND TERRITORIES OF THE WEST FROM 1800 TO 1880.

BY

ROBERT P. PORTER,

SPECIAL AGENT OF THE TENTH CENSUS ON WEALTH, DEBT, TAXATION, AND RAILROADS.

ASSISTED BY

HENRY GANNETT, S. B., E. M.,

GEOGRAPHER OF THE TENTH CENSUS;

AND

WM. P. JONES, A. M.,

CORRESPONDING MEMBER OF THE AMERICAN GEOGRAPHICAL SOCIETY.

WITH MAPS AND DIAGRAMS.

CHICAGO, ILL., U. S. A.:

RAND, McNALLY & COMPANY.

LONDON, ENG.:

TRÜBNER & CO., 57 AND 59 LUDGATE HILL.

1882.

Entered, according to Act of Congress, in the Year 1892, by

RAND, McNALLY AND COMPANY,

In the Office of the Librarian of Congress, at Washington, D. C.

978
P83w

TO THE

PIONEERS OF THE WEST,

BY WHOSE COURAGE, ENERGY, PERSEVERANCE AND FAITH A WILDERNESS
HAS BEEN CONVERTED INTO A FRUITFUL LAND—
SO VAST, SO FREE AND SO FAIR,

THIS VOLUME IS RESPECTFULLY

Dedicated

BY THE AUTHOR.

22 Feb. 49 Richards
28 Jan. 1918 Columbus

INTRODUCTION.

It is the aim to present in this volume a concise and accurate history of the progress of the States lying between the Alleghany and the Rocky Mountains and north of the Ohio river, Arkansas, and the Indian Territory, of the three States of the Pacific Slope, and of all the Territories of the United States except Alaska, from the beginning of the present century to the close of 1880. This vast portion of our country, covering an area of over two million square miles, and now containing nearly two-fifths of the entire population of the United States, was at the beginning of the nineteenth century a wild and almost unexplored region. To-day, the Western States and Territories have a population of nearly twenty millions; produce all our surplus meat and grain, and one-third of our manufactured products. Large and influential cities have arisen with wonderful rapidity, and the financial and commercial, as well as the agricultural, mining and manufacturing interests of this part of the United States have become of vast importance both at home and abroad. While this extraordinary advancement of civilization and development of resources in the West have been a prolific theme for writers, until the praises of this fair land have been sung in the most distant parts of the earth, no attempt has heretofore been made to bring into the treatment of the subject the light derived from recent and trustworthy statistics. The well authenticated facts, and the conclusions which these suggest, as brought together in the present volume, will, it is hoped, prove of permanent value not only to politico-economic science but to all persons who want to know the West as it is. In all cases the latest and most reliable official statistics have

been obtained, showing the progress of the last eight decades in agriculture, manufacturing, commerce, trade, railways, public wealth, public education, and morals, together with the most trustworthy geographical descriptions of the country discussed. I have attempted to relieve the dryness of the statistics throughout the work by sharply defined comparisons and by colored diagrams, which latter appeal to the eye and interest those who would not be attracted by rows of cold, leaden figures. The first three chapters contain summaries of the detail chapters which follow, and, though not successful in every case, I have endeavored to unfold the facts relating to every State and Territory in the same order, and, as far as the varied character of the sections would admit, bring out the same classes of information.

In the opening chapter comparison is made between the resources of foreign countries and the United States. The statistics used in these comparisons for foreign nations are taken from *Mulhall's Progress of Nations*, for 1880; those for the United States, from the preliminary reports of the Tenth Census, for which I am indebted to Professor Francis A. Walker, the eminent Superintendent of the Census Bureau.

I am anxious to express deep obligations to my able co-laborers, Mr. Henry Gannett and Professor W. P. Jones, the former for the admirable descriptions of Nevada, Colorado and the Territories, and the latter for a large portion of the work on the detail chapters descriptive of the Prairie States. I have also profited largely in preparing the work for the press by the advice and suggestions of Dr. Henry Randall Waite and Professor James H. Blodgett, the latter assisting me in obtaining and arranging the material for the chapter on the "Progress of Western Cities."

ROBERT P. PORTER.

WASHINGTON, D. C., Oct. 1, 1881.

CONTENTS.

CHAPTER		PAGE
I.	The Prairie States	9
II.	The Territories	79
III.	The Pacific States	94
IV.	State of Ohio	101
V.	State of Indiana	123
VI.	State of Illinois	137
VII.	State of Michigan	196
VIII.	State of Wisconsin	227
IX.	State of Minnesota	250
X.	State of Iowa	272
XI.	State of Missouri	294
XII.	State of Kansas	322
XIII.	State of Nebraska	348
XIV.	State of Colorado	372
XV.	Territory of Dakota	396
XVI.	Territory of Montana	409
XVII.	Territory of Wyoming	419
XVIII.	Territory of Idaho	430
XIX.	Territory of Utah	437
XX.	Territory of New Mexico	447
XXI.	Territory of Arizona	455
XXII.	Territory of Washington	463
XXIII.	State of Nevada	470
XXIV.	State of Oregon	479
XXV.	State of California	490
XXVI.	Progress of Western Cities	516
XXVII.	Railroads, Canals, and Public Lands	554
	Appendix	599
	Index	613

THE WEST.

CHAPTER I.

THE PRAIRIE STATES.

At the opening of the century the Old World was dark with war, industrial depression, and famine, while the New World seemed full of promise, and awakened hope and joy in the large army with strong hands and hopeful hearts anxious to leave over-crowded Europe. The population of the civilized countries of the world has doubled since the beginning of the present century; the United Kingdom and colonies having, in 1801, seventeen millions; whereas to-day they have forty-three millions. The European continent then had one hundred and seventy millions: to-day it has two hundred and seventy-five millions: and the United States, then with a population of five millions, to-day has upward of fifty millions. Thus have these nations increased from one hundred and ninety-two millions to three hundred and sixty-eight millions. The population of Great Britain and the United States combined has risen from twenty-two millions to ninety-three millions, an increase of three hundred and twenty-three per cent.; while the population of the European continent rose only sixty-three per cent. During the last sixty years, no less than sixteen millions of people have left the Old World for homes in America and the British colonies; of whom nearly eleven millions have landed on the shores of the United States. This migration—combined with the opening up of new countries, the great changes brought about by the application of steam, the extension of railroads, the improvement of ocean navigation, the connection of continents by telegraph, and the spread of knowledge by schools and by the daily press—has made the present the most progressive of all centuries to the Anglo-Saxon race. People are better fed and better clothed; and, with the advance of science and the extension of knowledge, opportunities on all sides increase. The invention of machinery has done much to bring this about. The United States, for example, makes a million sewing-machines yearly,

which can do as much work as would formerly have required twelve millions of women working by hand. A single shoe factory in Massachusetts turns out as many pairs of boots as thirty thousand boot-makers in Paris. At Birmingham, where Gillott sold his first steel pens a few years ago at a shilling apiece, the factories now produce thirty-two million weekly at a penny a dozen. Steam power multiplies indefinitely the forces of a nation. At the beginning of the century, the backwoods of the United States afforded the chief supply of material for ship building. The invention of iron ships has changed this entire industry; and it is said that the yard of one iron ship company in England has for some years turned out more tonnage per annum than the whole of Queen Elizabeth's fleet that defeated the Spanish Armada.

In the food supply of the world, there has been notable progress within less than half a century, not only by reason of the introduction of railways and steamers, but also by the removal of arbitrary laws against grain. Forty years ago the peasants of Castile and Leon saw their wheat rotting in the subterranean *silos* provided by the government, because it was forbidden to export it. Forty years ago Great Britain paid famine prices for bread, sooner than repeal the corn laws, while the moujiks of the Don had such abundant crops that wheat was too cheap to pay the cost of freight to the nearest port. Forty years ago, owing to the want of roads, the price of grain in Western Prussia was double that which ruled in the eastern part of the kingdom. Before the epoch of railroads and the repeal of the corn law, the price of wheat ruled one hundred and fifty per cent. higher in England than in Hungary. In the subsequent epoch the difference was only twenty-three per cent. The English and the Americans are the best-fed people of the present age; and therefore they are able to accomplish the greatest amount of work. According to Vauban, Bossuet, and Lagrange (three names illustrious in war, religion, and science, respectively), "that country must be considered the most prosperous in which the inhabitants are able to have the largest ratio of meat for their food." The United States, it is said, consumes 120 pounds of meat per inhabitant; the United Kingdom, 110 pounds; France, 66 pounds; Switzerland, 51 pounds; Germany, 48 pounds; Scandinavia, 45 pounds; Russia, 44 pounds; the Low Countries, 40 pounds; Austria, 30

pounds; Spain, 29 pounds; Italy, 23 pounds; Portugal, 20 pounds. The United Kingdom, the United States, and Russia consume each eight bushels of grain per inhabitant; France and Germany, each seven bushels; Austria, the Low Countries, and Spain, each six bushels; Italy, Switzerland, Scandinavia, and Portugal, each five bushels. The world consumes thirty-eight million five hundred thousand tons of wheat yearly; and the wheat lands of the world make up one hundred and five million acres.* The supply and demand are shown as follows:

WHEAT.

Countries.	Crop, Bushels.	Consumption, Bushels.	Surplus, Bushels.	Deficit, Bushels.
United States	450,000,000	300,000,000	150,000,000	
France	280,000,000	280,000,000		80,000,000
Russia	160,000,000	80,000,000	80,000,000	
Germany	150,000,000	170,000,000		20,000,000
Italy	140,000,000	145,000,000		5,000,000
Turkey	90,000,000	80,000,000	10,000,000	
United Kingdom	90,000,000	200,000,000		110,000,000
Austria	90,000,000	76,000,000	14,000,000	
Spain and Portugal	85,000,000	85,000,000		
Canada	40,000,000	30,000,000	10,000,000	
Australia	30,000,000	15,000,000	15,000,000	
Chili	15,000,000	10,000,000	5,000,000	
Other countries	20,000,000	139,000,000		119,000,000
Totals	1,590,000,000	1,590,000,000	284,000,000	284,000,000

The wheat fields have been extending prodigiously in the last twenty years. "Down to 1850," says Mulhall,* "the United States used at intervals to import wheat from Europe; whereas it produces at present one-fourth of the world's crop. Previous to 1865, Australia was fed with Chilian flour; but, since 1854, some of the Australian colonies have annually exported twenty bushels of grain per inhabitant. Facilities for transportation have so far improved that wheat grown on the Mississippi or in New Zealand is sold as cheap in Europe as that raised on the Don or Danube."

During the last century the average consumption of meat in Europe was only twenty-five pounds per head yearly, or less than half what it is at present. As Europe is no longer able to raise enough cattle for her population, an extra supply is drawn from North America, which is consumed chiefly in Great

* Mulhall's "Progress of Nations."

Britain; the shipments of cattle and meat from the United States in 1880, exceeding a value of $35,000,000. The three great pasture farms destined to feed Europe with meat are the United States, the River Plata, in South America, and Australia. These countries, it is said, could easily export ten million cows and sixty million sheep annually without reducing the number of their stock.

Mulhall estimates that one hundred and twenty thousand vessels, manned by half a million of fishermen, are engaged in the fisheries of Europe. According to the recent report of Professor Goode on the fisheries of the United States, from eight hundred thousand to one million persons are engaged in fisheries in this country; but he includes in this estimate those who are indirectly connected with the industry, and the families of fishermen, who are dependent upon them for support.

Wine is the other great requirement for the food of mankind; and the area under vineyards is increasing every year. More than twenty million acres in Europe are under grapes. France, in the earlier part of the present century, produced eight hundred millions of gallons yearly; but in later years the vintage has averaged twelve hundred millions, representing a value of $240,000,000, ninety-four per cent. being kept for home consumption, and only six per cent. exported. The new vine-growing countries of the world are: the United States, Australia, and South Africa. The following table shows the number of acres under cultivation, gallons produced, and yield in gallons per acre:

WINE.

Countries.	Acres under Vines.	Gallons.	Gallons per Acre.
United States	130,000	20,800,000	160
Australia	15,000	1,800,000	120
South Africa	18,000	4,500,000	250

Spirits are largely consumed in countries where the supply of wine is deficient; and it is claimed that the consumption of this kind of liquor is increasing faster than the population. In 1869 the United States produced 196,603,705 gallons of fermented liquors: last year no less than 413,760,410 gallons were produced, and only a million gallons imported—the total consumption exceeding 414,000,000 gallons.

The following table shows the number of acres under cultiva-

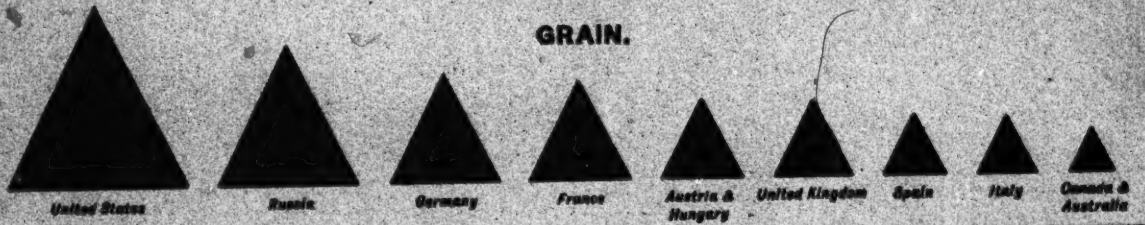
Plate I

GRAIN and FOREST PRODUCTS of the WORLD.

Millions of Dollars.

1880.

GRAIN.



(19)

Plate II

FOREST.

DOUBLE THE SCALE OF GRAIN.

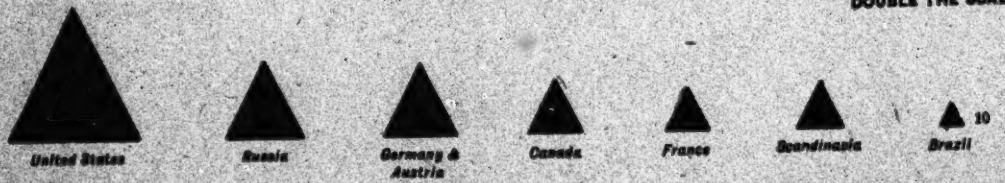


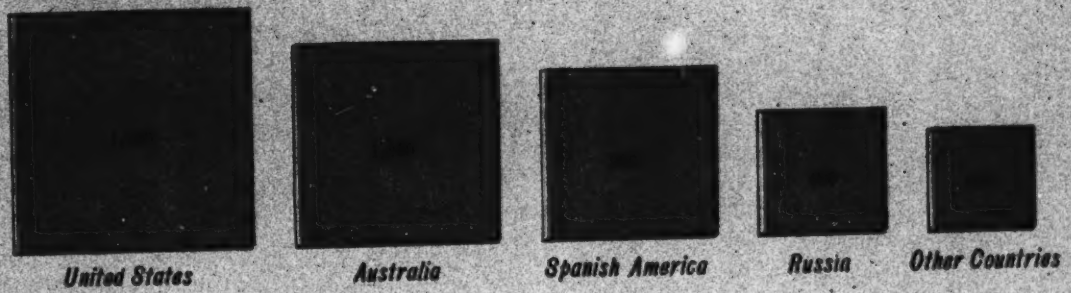
Plate III

YIELD of PRECIOUS METALS.

GOLD and SILVER

Millions of Dollars.

From 1800 to 1880.



tion in each country, the quantity of grain raised, the average yield per acre, and the yield per capita: *

Countries.	Acres under Grain.	Bushels.	Per Acre.	Per Male Peasant.
United States	118,000,000	2,068,000,000	23	508
Russia	158,000,000	1,595,000,000	10	158
Germany	42,000,000	990,000,000	23	245
France	40,000,000	840,000,000	21	220
Austro-Hungary	35,000,000	530,000,000	15	180
United Kingdom	12,500,000	455,000,000	36	340
Spain	15,000,000	300,000,000	20	160
Italy	18,000,000	270,000,000	15	140
Canada and Australia	14,000,000	140,000,000	10	850

Diagram No. I., on page 13, shows the total cereal product of the United States, with that of some of the principal countries of the world. It is fair to estimate that our annual income from agricultural industries is not far short of $3,000,000,000. That of France is about $1,900,000,000; of Russia, $1,850,000,000; of Germany, $1,700,000,000; of the United Kingdom, $1,325,000,000; of Austro-Hungary, $1,315,000,000; of Italy, $710,000,000; of Spain and Portugal, $650,000,000; of Scandinavia, $390,000,000; and of the Low Countries, $375,000,000. Total, $13,215,000,000.

The total area of forest wealth of the United States, Russia, Germany, Austria, Canada, Scandinavia, France, Brazil, and El Gran Chaco, is 2,760,000,000 acres; the total annual product from which is $780,000,000, of which the United States, as shown in Diagram II., page 13, produces over fifty per cent., or $385,000,000.

Michael Chevalier estimates, that, at the period of the discovery of America, the total amount of gold in Europe was only $60,000,000, and of silver, $140,000,000. A new epoch occurred with the discovery of gold in California and Australia. The progress of this form of wealth is summarized as follows *:

Dates.	Gold.	Silver.	Total.
1492	$ 100,000,000	$ 200,000,000	$ 300,000,000
1700	1,125,000,000	2,600,000,000	3,725,000,000
1800	2,200,000,000	5,120,000,000	7,320,000,000
1848	2,900,000,000	6,510,000,000	9,410,000,000
1890	6,100,000,000	8,060,000,000	14,160,000,000

* The table is borrowed from Mulhall's "Progress of Nations," 1891.

The United States, as shown in Diagrams III. and IV., pages 14 and 17, stands first of all countries in the yield of precious metals and in the product of its manufactories. By a strange coincidence, the annual yield of California and that of Australia has averaged the same amount, namely, $45,000,000; and in each case the highest year reached $75,000,000, the number of diggers being also nearly equal, and their gains averaging from $500 to $750 per man per annum.

These are the changes of eighty years. The changes of the past decade, both at home and abroad, are even more striking and interesting, because within the memory of the youngest. This marvelous industrial activity and almost uncheckered career of prosperity and growing wealth is admirably presented in a little work just published in England,* in which the writer measures each and every element of progress in the various nations, and briefly sums up the results for the world as follows:

Increase of—	Per cent.	Increase of—	Per cent.
Population	9.76	Carrying trade	58.22
Agriculture	8.58	Earnings of nations	19.84
Manufactures	18.60	Public wealth	10.67
Commerce	38.20	Taxes	22.34
Mining	47.06	Public debt	43.39

This writer seems to think that a most remarkable feature is the improvement in the financial condition of mankind, the earnings of nations having risen in twice the ratio of the population. It is true that public debt has increased forty-three per cent.; but this is by no means alarming, since the cost of new railways, built since 1870, is $920,000,000 over the total of new debts. Moreover, the tangible increment of wealth since 1870, would suffice to pay off eighty-eight per cent. of all existing national debts. In like manner, although taxation has grown twenty-two and a half per cent., which is more than the geometrical progression of earnings, the net balance per head of population is higher. I am inclined to agree with Mulhall when he says that the secret of prosperity is to be the development of the carrying trade by land and sea, and the cheapening of the products of industry by placing the producer and consumer in closer relations than before.

As will be seen in the following table and also in Diagram V., page 18, the industries of the United States are greater than those of any other country in the world:

* "The Balance Sheet of the World." Mulhall: London, England.

Plate IV

THE WORLD'S MANUFACTURES.

Millions of Dollars
1880.

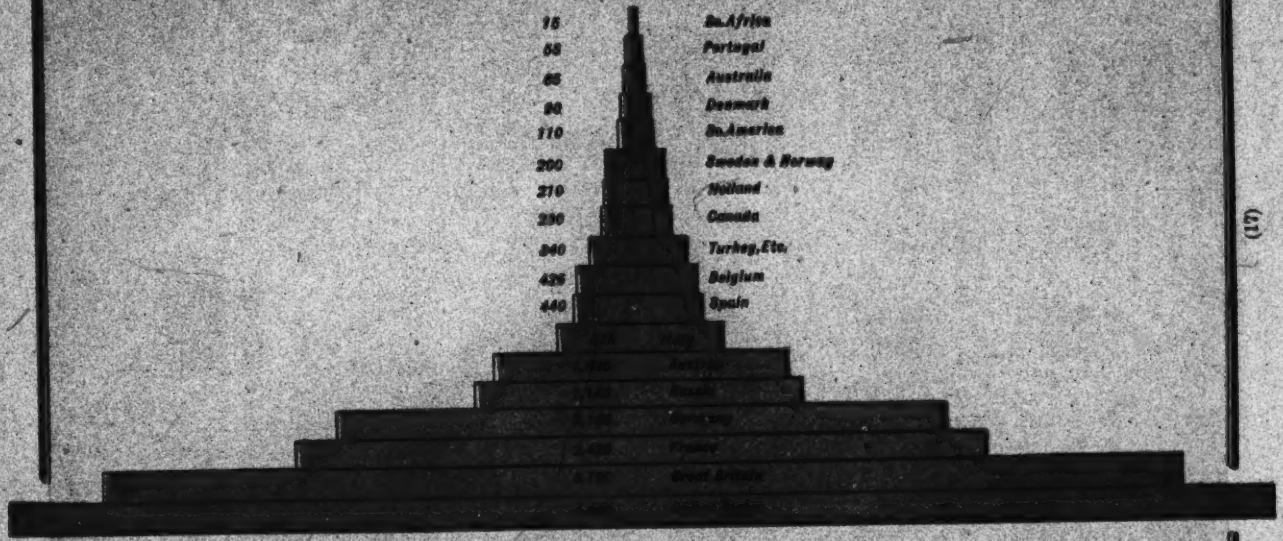
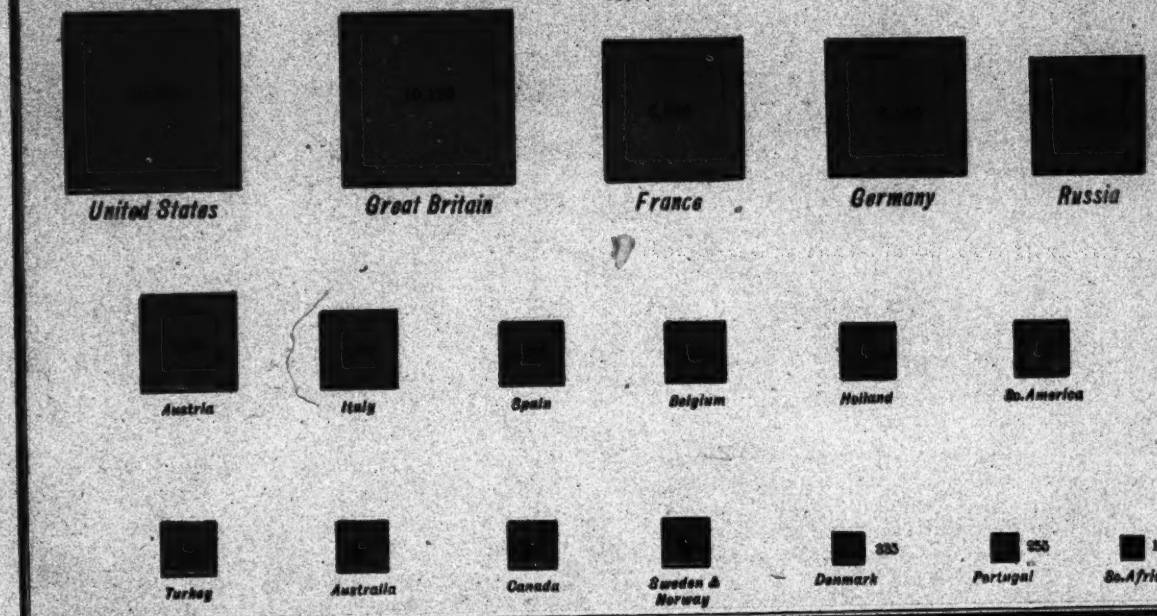


Plate V

TOTAL INDUSTRIAL PRODUCTS of NATIONS.

Millions of Dollars.

1880.



(18)

COMMERCE, INDUSTRIES, AND BANKING OF THE PRINCIPAL COUNTRIES OF THE WORLD.

Countries.	Commerce.	Manufactures.	Mining.	Agriculture.	Carrying Trade.	Banking.	Totals.
United States	$1,505,000,000	$4,440,000,000	$360,000,000	$3,000,000,000	$330,000,000	$360,000,000	$10,295,000,000
Great Britain	3,460,000,000	3,790,000,000	225,000,000	1,200,000,000	605,000,000	540,000,000	10,120,000,000
France	1,660,000,000	2,435,000,000	60,000,000	2,000,000,000	310,000,000	170,000,000	6,625,000,000
Germany	1,920,000,000	2,135,000,000	105,000,000	1,700,000,000	245,000,000	140,000,000	6,245,000,000
Russia	955,000,000	1,145,000,000	55,000,000	1,850,000,000	220,000,000	75,000,000	4,300,000,000
Austria	700,000,000	1,080,000,000	35,000,000	1,315,000,000	120,000,000	85,000,000	3,335,000,000
Italy	480,000,000	675,000,000	10,000,000	735,000,000	75,000,000	80,000,000	1,895,000,000
Spain	190,000,000	440,000,000	35,000,000	545,000,000	60,000,000	15,000,000	1,285,000,000
Belgium	515,000,000	495,000,000	40,000,000	175,000,000	40,000,000	15,000,000	1,210,000,000
Holland	550,000,000	210,000,000	.....	220,000,000	35,000,000	70,000,000	1,085,000,000
Australia	445,000,000	65,000,000	20,000,000	280,000,000	15,000,000	50,000,000	865,000,000
Canada	175,000,000	230,000,000	.....	300,000,000	45,000,000	20,000,000	770,000,000
Sweden and Norway	180,000,000	200,000,000	10,000,000	260,000,000	75,000,000	15,000,000	740,000,000
Denmark	98,000,000	90,000,000	.....	135,000,000	10,000,000	5,000,000	338,000,000
Portugal	65,000,000	55,000,000	.....	125,000,000	5,000,000	5,000,000	255,000,000
Turkey, etc.	315,000,000	340,000,000	.....	235,000,000	30,000,000	15,000,000	935,000,000
South Africa	35,000,000	15,000,000	20,000,000	35,000,000	.....	.....	105,000,000
South America	450,000,000	110,000,000	40,000,000	400,000,000	30,000,000	25,000,000	1,055,000,000
The World	$13,745,000,000	$17,730,000,000	$1,135,000,000	$14,490,000,000	$3,040,000,000	$1,535,000,000	$51,665,000,000

In a like way, the national income of the United States is greater than that of any other country in the world; and yet our military expenditures are less. These two facts are well brought out by Diagram VIII., presented on page 27. With a national income of upward of seven billion dollars, our military force is not more than one-twentieth of one per cent. of the whole population; and the cost, in comparison with that of some other countries, is insignificant. It is evident from these figures that European nations are heavily handicapped with large standing armies; the armies of Continental Europe alone numbering 3,215,000 men, or a little over one per cent. of the population, while the United States has an army of less than twenty-five thousand men. This fact at once gives the United States an almost incalculable advantage over Europe; and, so long as the latter does not change her present political system, this advantage must swell into more and more gigantic proportions.

The march of civilization has been, in the present century, to some degree identified with the progress of manufactures. The industries that now occupy twelve and a half millions of workmen in Europe were in their infancy at the period of Waterloo; and, since that time, the countries most advanced in manufactures have been the most prosperous. The United States, if the manufacture of flour is included, stands first of all countries in the world: the annual product is nearly four and a half billion dollars; and it is not improbable that nearly three millions of operatives are employed in its various industries. The product per operative, owing to the greater intelligence and skill of American artisans, is higher in the United States, namely, $1,560 for each; in the United Kingdom, $1,120; in France, $1,100; in Germany, $515, in Russia, $530; in Austria, $600; in the Low Countries, $500; in Spain and Portugal, $595; in Italy, $540; in Scandinavia, $450; in the colonies, $500 for each.

The textile manufactures employ three and a half million workmen. England, of course, stands first in this regard; but the United States holds the second position, and, as estimated, produced in 1880 a combined product of cotton and woolen goods valued at $420,000,000; the total product for the world being $2,435,000,000. The United States manufactures about one-sixth of the entire textile product of the world. More than two-thirds of the world's cotton crop is grown in the United States, the product, according to the Census of 1880, being

5,730,968 bales. The world's product of silk is estimated at $400,000,000; and something over half a million of operatives are employed in this industry. France leads, with 170,000 operatives and a product of $240,000,000. According to the report of Special Census Agent Wyckoff, 34,440 persons are employed in the United States in the manufacture of silk; and the total value of the product is $34,410,468, thus producing about eight per cent. of the total production of the world.

In 1850 the iron-producing countries of the world manufactured about 4,360,000 tons of iron, of which but a little over half a million tons was produced by the United States. The construction of railways and the building of iron vessels have caused the production of iron to quadruple within thirty years; and to-day these countries produce upward of 18,000,000 tons, 7,265,140 tons of which are produced in the United States. Last year we produced 741,475 tons of Bessemer steel rails, while the total product of the United Kingdom was only 732,910 tons. The United States to-day makes one-fourth of the world's iron and one-fifth of its steel.

The total production of the iron and steel works of the United States in the Census year 1880, was 7,265,140 tons; in 1870, it was 3,655,215 tons; increase, 3,609,925 tons, or 98.76 per cent. The following table shows the production of each branch of our iron and steel industries in 1870 and 1880, with the percentage of increase or decrease in the latter year:

Iron and Steel Products.	Net Tons for Census Year 1870.	Net Tons for Census Year 1880.	Percentage of Increase in 1880.
Pig-iron and castings from furnace	2,003,831	3,781,021	84
All products of iron rolling-mills	1,441,829	2,453,249	68
Bessemer steel finished products	19,406	889,896	4,486
Open-hearth steel finished products	.....	98,148	.....
Crucible steel finished products	93,069	70,819	151
Blister and other steel	2,285	4,056	117
Products of forges and bloomaries	110,803	73,537	*35
Totals	3,655,215	7,265,140	99

The whole amount of capital invested in the iron and steel industries of the United States, as will be seen from the subjoined table, was, in 1880, $230,971,884. In 1870, it was $121,772,074; increase for 1880, $109,199,810, or nearly ninety per cent.:

* Decrease.

Grand Divisions.	Number of Establishments.	Capital Invested.	Hands Employ'd	Wages Paid.	Net Tons Produced.	Value of all Products.
Eastern States	888	$140,877,421	88,049	$54,321,490	4,671,000	$100,000,000
Southern States	115	20,140,240	20,000	6,251,544	646,100	25,000,000
Western States and Territories	894	80,725,000	26,000	14,540,557	1,913,000	75,000,000
Pacific States and Territories	7	1,582,425	979	311,154	21,400	1,974,725
Total United States	1,005	$293,271,084	140,978	$75,473,725	7,252,140	$202,974,725

Seventy years ago the world produced annually nine million tons of coal, or one-thirtieth of the present quantity; the only coal fields then worked being those of England, although the mineral was known to exist in France, Germany, and North America. Coming down to about 1820, the production of the world had risen to forty million tons, of which Great Britain produced four-fifths. Since the introduction of railways and steamers, the product in Great Britain has increased to one hundred and thirty-five million tons, and in the United States probably seventy million tons, and in Germany to forty-five million tons; the product of the world reaching somewhere in the neighborhood of three hundred million tons. In England, there are probably four hundred and fifty thousand miners engaged in this work, and in our own country nearly two hundred thousand. Prof. Pumpelly shows that, in 1880, 68,239 persons are engaged in the anthracite coal industry in Pennsylvania, and that the output has increased from 15,596,257 tons to 27,433,329 tons, or 11,837,072 tons, a gain of nearly seventy-six per cent. The capital invested has increased still more prodigiously, from $50,807,285 in 1870, to $150,161,196 in 1880, an increase of 195 per cent. Assuming that only twenty-seven per cent. of the total contents of the anthracite coal field could be mined and marketed, the production of anthracite in the United States after 1880 would reach 4,009,640,000 net tons before exhaustion. Thus the output of the Census year could be maintained for 146 years. The mining industries of all nations, not including the precious metals, give employment to a million and a half miners. Almost half a million of these are employed in the mines of the United Kingdom, and over a quarter of a million in the United States.

A glance at the following table shows that the rates of wages per week in the United States, roughly estimated, are more than

twice those in Belgium; three times those in Denmark, France, and Germany; once and a half those in England and Scotland; and more than three times those in Italy and Spain;

Occupation.	Belgium.	Denmark.	France.	Germany.	Italy.	Spain.	England.	Scotland.	New York.	Chicago.
Bricklayers	$6.00		$4.00	$6.00	$3.45	$5.18	$6.12	$6.00	$12.00 to $18.00	$6.00 to $10.00
Carpenters	5.40	$4.60	6.42	4.00	4.18	4.60	6.25	5.18	9.00 " 12.00	7.20 " 14.00
Gas fitters	5.40			6.00	5.00		7.50	6.40	10.00 " 14.00	10.00 " 12.00
Masons	6.00	4.60	5.00	4.80	4.00	4.80	6.15	5.18	12.00 " 18.00	12.00 " 15.00
Paint rs	4.80	4.18	4.80	4.80	4.00		7.50	6.18	10.00 " 16.00	8.00 " 12.00
Plasterers	5.40			6.00	4.18	7.20	6.10	10.13	10.00 " 15.00	9.00 " 12.00
Plumbers	6.00		5.00	6.00	5.00		7.75	7.13	12.00 " 18.00	12.00 " 20.00
Bakers	4.40	4.60	5.00	3.60	3.60	3.60	6.25	6.00	8.00 " 12.00	8.00 " 12.00
Blacksmiths	4.40	3.60	5.40	3.60	3.60	4.00	6.25	7.06	10.00 " 14.00	9.00 " 20.00
Bookbinders		3.78	4.00	4.80	4.80	5.40	7.50	6.50	12.00 " 16.00	9.00 " 15.00
Brass-founders		4.80		6.00	5.40		7.50	6.00	10.00 " 14.00	8.00 " 15.00
Butchers	4.80	4.80	5.40	4.80	4.80		7.50	4.75	8.00 " 12.00	12.00 " 16.00
Cabinet-makers	4.80		5.00	3.57	4.80	4.80	7.50	6.25	12.00 " 18.00	7.00 " 15.00
Coopers		4.18	7.00	3.60	4.80	4.80	7.50	6.10	12.00 " 16.00	6.00 " 15.00
Coppersmiths		3.85		3.60	3.60		7.50	7.10	12.00 " 20.00	15.00 " 20.00
Cutlers		3.60	4.60	4.00	3.60		6.00	6.25	10.00 " 13.00	15.00 " 20.00
Engravers				4.00	4.00		9.12	8.75	15.00 " 25.00	9.00 " 20.00
Horseshoers		5.25	5.40	3.60	3.60		7.50	7.00	12.00 " 18.00	15.00 " 20.00
Mill-wrights		4.00		3.60	4.80		7.50	7.50	10.00 " 15.00	12.00 " 20.00
Printers		4.60	4.70	4.80	3.60		7.75	7.50	8.00 " 15.00	12.00 " 15.00
Harness-makers	4.80	3.25	5.00	3.60	3.60		6.50	6.18	12.00 " 18.00	12.00 " 18.00
Sailmakers		4.60		3.60	3.60		7.50	6.25	12.00 " 18.00	9.00 " 18.00
Shoemakers		3.60	4.70	3.17	4.80	3.60	7.50	7.50	12.00 " 18.00	6.00 " 10.00
Tailors		4.10	5.10	3.60	4.80	3.60	7.50	7.00	10.00 " 14.00	9.00 " 12.00
Tinsmiths	4.80	3.60	4.60	3.60	3.60	3.60	7.50	6.00	10.00 " 14.00	8.00 " 9.00
Laborers	3.00			2.40	2.40	3.00	5.00	4.00	6.00 " 8.00	5.00 " 9.00

It is impossible, within the limits of this chapter, to give in detail the prices of the necessaries of life in the various countries represented in the tabulated statements already given. The cost of living is less in the United States than in any of the countries reported. Europe can not purchase the necessaries of life, which are common to the American working people, so low as the same can be purchased in the United States: for example, the price of food in Great Britain, according to the figures furnished by the consuls, is fully twenty-five per cent. higher than at New York, and fifty per cent. higher than at Chicago. Fresh meat in England is put down at fifteen to twenty-six cents per pound, against twelve to sixteen cents per pound at New York, and eight to thirteen cents per pound at Chicago. Perhaps the most striking picture of the comparative condition of the American workingman and of his fellow laborer abroad may be had by a comparison of his condition in New York City and in Belgium. Let us see from the following tabulated statement the comparative prices of the principal necessaries of life in Brussels and in New York:

Articles.	Brussels. Per lb., cents.	New York. Per lb., cents.	Articles.	Brussels. Per lb., cents.	New York. Per lb., cents.
Bread	4 to 5	4½	Lard	20	10 to 12
Beef	16 " 20	8 to 16	Butter	20 to 25	25 " 32
Veal	16 " 20	8 " 24	Cheese	20 " 25	12 " 15
Mutton	16 " 20	9 " 16	Coffee	30 " 40	20 " 30
Pork	16 " 20	8 " 16	Sugar	15 " 20	8 " 10

Thus the workingmen of the Republic have a better future to look for; while their brethren in Europe have no "better days" to contemplate: they must either toil and mourn to the end, or emigrate. As the old ballad runs:

> And the smith complains to the anvil's song,
> Complains of the years he has toiled and pined;
> For the priest and the ruler are swift to wrong,
> And the mills of God are slow to grind.
>
> But a clear, keen voice comes over the sea;
> It is piercing the gloom of the waning night:
> Time was, time is, and time shall be,
> When John o' the smithy shall come by his right!

It is claimed that some of the contractors who have been engaged in building the railroads of the world have had armies of workmen more numerous than either of the contending hosts at Waterloo, their annual payments for wages being equal to the revenue of a kingdom. It is not surprising, then, that railroads have increased in mileage with great rapidity, as definitely shown in the following table, where the miles of railway in operation on the entire globe are given, at six decennial periods:

Countries.	1830.	1840.	1850.	1860.	1870.	1880.
Europe	152	1,898	14,758	32,008	64,425	95,017
Asia				867	4,949	7,189
Africa				276	1,101	2,021
America	54	3,497	8,853	33,070	59,863	107,865
Australia				164	1,125	2,970
Totals	206	5,395	23,611	66,385	131,463	215,062

The railroad system properly began in the United States in 1830. Its advent is graphically described in Mr. Adams' little book on the "Origin of Railroads." Poor and crude as our country was then, it was more ready to follow the initiative

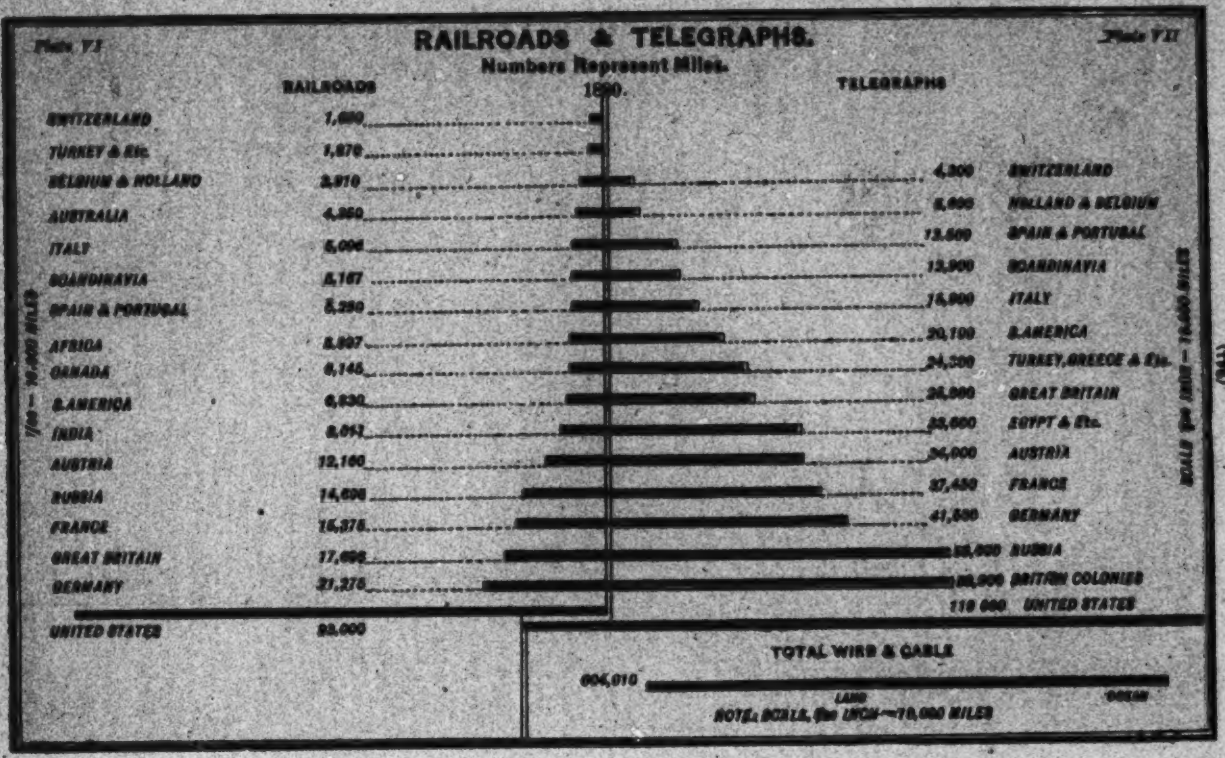


Plate VI
RAILROADS & TELEGRAPHS.
Numbers Represent Miles.
1890.
Plate VII
RAILROADS
TELEGRAPHS
SWITZERLAND 1,650
TURKEY & Etc. 1,870
BELGIUM & HOLLAND 2,910
AUSTRALIA 4,950
ITALY 5,006
SCANDINAVIA 5,167
SPAIN & PORTUGAL 5,290
AFRICA 5,907
CANADA 6,145
S.AMERICA 6,930
INDIA 8,051
AUSTRIA 12,160
RUSSIA 14,606
FRANCE 15,376
GREAT BRITAIN 17,696
GERMANY 21,276
UNITED STATES 93,000
4,300 SWITZERLAND
6,600 HOLLAND & BELGIUM
13,500 SPAIN & PORTUGAL
13,900 SCANDINAVIA
16,900 ITALY
20,100 S.AMERICA
24,300 TURKEY, GREECE & Etc.
26,000 GREAT BRITAIN
33,000 EGYPT & Etc.
34,000 AUSTRIA
37,450 FRANCE
41,500 GERMANY
55,000 RUSSIA
80,000 BRITISH COLONIES
110 000 UNITED STATES
TOTAL WIRE & CABLE
604,010
LAND
OCEAN
NOTE: SCALE, One INCH = 10,000 MILES
One Inch = 10,000 Miles
Scale One Inch = 10,000 Miles

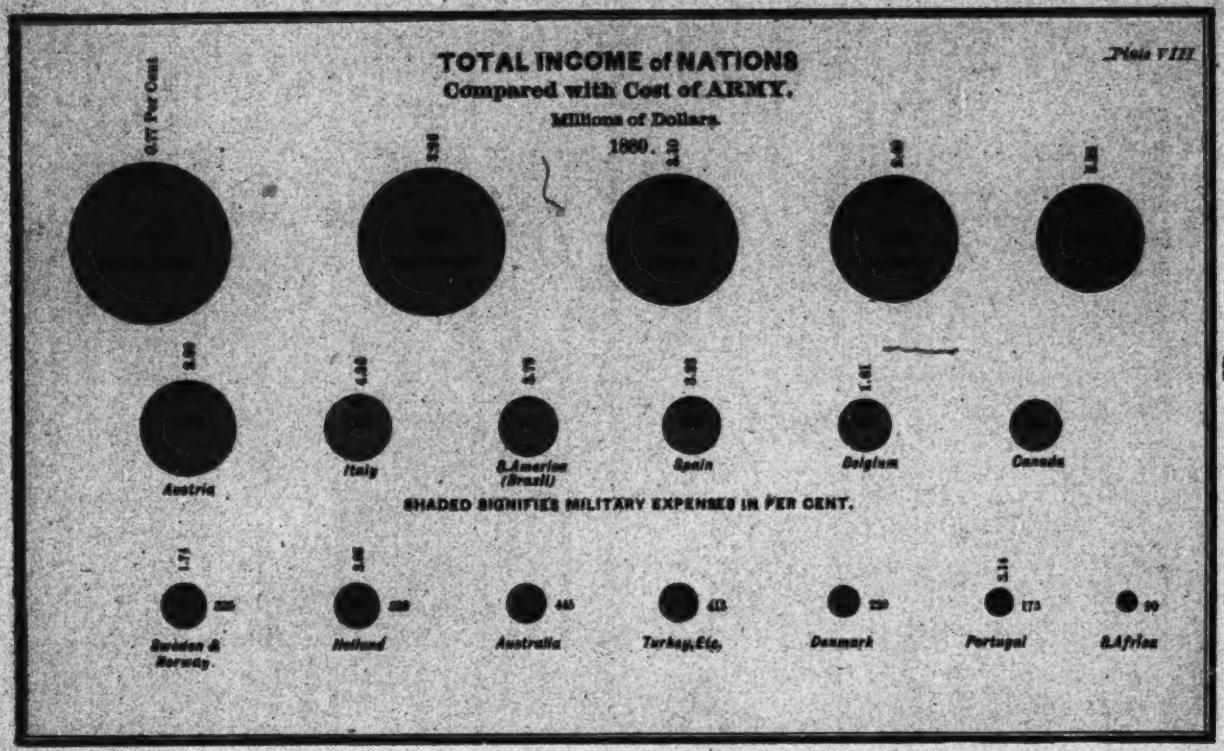
which Great Britain gave in 1830 than any other country in the world. "Belgium," says Mr. Adams, "under the enlightened rule of King Leopold, did not move in the new departure until 1834; and France was slower yet." It appears that these countries did not feel the need of railroads as the United States and England did. They already had excellent systems of wagon roads. In our country such roads were few and badly built; while in England, though they were good enough, the volume of traffic had outgrown their capacity. The relief came. Massachusetts, according to Adams, led off, in 1826; Pennsylvania followed, in 1827; and, in 1828, Maryland and South Carolina followed. Of the great trunk lines of the country, a portion of the New York Central was chartered in 1825; the construction of the Baltimore & Ohio was begun on July 4, 1828. It was not, however, until 1841 that the world became accustomed to the new condition of existence, and refused to gape in wonder at the locomotive. From this date the growth of the railway system in the United States was assured.

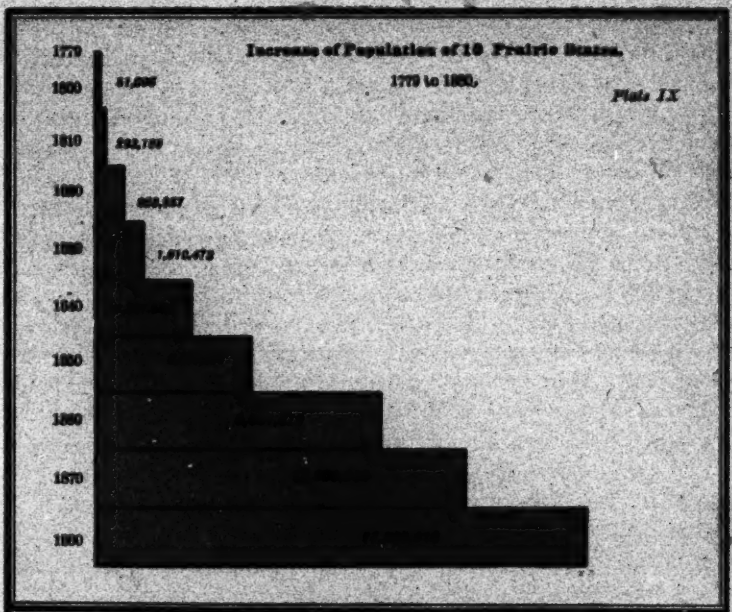
In the midst of this progressive era, in which the older countries have made long strides, what a wonderful national growth the Republic presents. At the close of the eighth decade of this century, the population has increased, in round numbers, at the rate of thirty-six, thirty-three, thirty-three, thirty-two, thirty-five, thirty-five, twenty-two, and thirty per cent. respectively for each decade; it has traveled westward at the rate of thirty-six, fifty, thirty-nine, fifty-five, fifty-five, eighty-one, forty-two, and fifty-eight miles in the respective decades, until now the centre of population is eight miles west by south from the heart of the city of Cincinnati. Eight decades ago population straggled over an area of 239,935 square miles: it now extends over 1,569,570, to say nothing of the additional 1,450,000 square miles of territory belonging to the United States, but as yet sparsely settled. The first decade of this century opened with a half-dozen small towns: the eighth decade closes with the United States third in the rank with European nations in respect to cities, and first as the granary and storehouse of the world. Distributed within this fair portion of the earth is a population of 25,520,582 males and 24,632,284 females; of 48,475,506 native and 6,677,360 foreign born; of 48,404,876 white and 6,577,151 colored. This

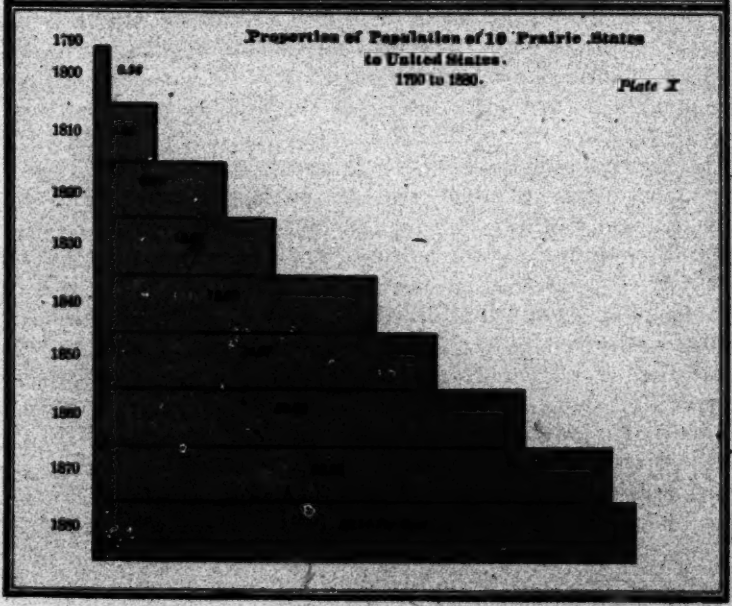
population, varied as it is in color and in race, is spread over our many latitudes, and extends from the Atlantic to the Pacific ocean. It thrives best in the valleys of our large rivers, and along the Atlantic coast; it breathes best in elevations below 2,000 feet, and increases and multiplies most rapidly in a temperature of from 50° to 55° Fahrenheit.

Satisfactory and wonderful as I have shown the agricultural growth of the country to be, the development of the nation in other branches of its industries has not been less remarkable. Ten years ago the balance of trade was against us; but to-day our exports are thirty-one per cent. over our imports. Ten years ago our commerce was represented by $680,000,000: to-day it is upward of $1,500,000,000. Ten years ago our manufactures aggregated about $4,000,000,000; to-day, $5,500,000,000. Ten years ago the annual product of our mining industries was $190,000,000: to-day it is as many millions of dollars as there are days in the year. Ten years ago the prolific soil of the republic produced little over two billions of wealth: to-day the value of these products is upward of $3,000,000,000. Our carrying trade ten years ago was $570,000,000: to-day, it is over $700,000,000. The actual increase of American industry in ten years has been $2,625,000,000. This is not all. We are fast ranking as a manufacturing nation. To speak of mineral wealth in more detail: the products of our iron mines increased one hundred and ten per cent., our copper mines sixty per cent., and our coal sixty-six per cent.; while the yield of petroleum has increased twenty-four fold. We have doubled the mileage of our railroads, our commercial failures have declined fifty per cent., our population has increased thirty per cent., and nearly two and a fifth million persons have found their way to our shores as emigrants. In the midst of this prosperity, we can proudly say, the skillful management of our finances has reduced the national debt twenty per cent. in ten years. It has been paid at the rate of one hundred and sixty thousand dollars a day; and the reduction of the interest makes the burden hardly half what it was a decade ago.

In the early part of the present century, THE WEST, as defined in this volume—embracing all the States north of the Ohio river, Arkansas, and the Indian Territory, lying between the Alleghany and the Rocky Mountains, the three States of the Pacific slope, and all the Territories of the United States except Alaska, and


TOTAL INCOME of NATIONS
Compared with Cost of ARMY.
Millions of Dollars.
1860.
Plate VIII
0.57 Per Cent
Austria
Italy
S.Americn (Brazil)
Spain
Belgium
Canada
SHADED SIGNIFIES MILITARY EXPENSES IN PER CENT.
Sweden & Norway
Holland
Australia
Turkey, Etc.
Denmark
Portugal
S.Africa


Increase of Population of 10 Prairie States.
1779 to 1880.
Plate IX
1779
1800
1810
1820
1830
1840
1850
1860
1870
1880


Proportion of Population of 10 Prairie States to United States.
1790 to 1880.
Plate X
1790
1800
1810
1820
1830
1840
1850
1860
1870
1880

covering an area of 2,023,890 square miles, or not less than 1,295,244,800 acres—was populated by little over fifty thousand. The general geographical features of this great area may be briefly epitomized. Only in the most eastern of this group of States (Ohio) is found any portion of the great Appalachian system of uplift. This is shown in a broad swell, in the northern part of the State, trending parallel to the lake shore. South from this, the country falls in gentle undulations, becoming, however, quite rugged in the neighborhood of the Ohio. This region is one of transition from the Alleghany Mountains to the prairie region, and continues westward into Indiana, where it blends with the true prairies. These extend over the western part of Indiana, Southern Michigan, Wisconsin, and Minnesota; over Illinois and Iowa and most of Missouri; besides extending into Dakota, Nebraska, and Kansas an indefinable distance, where they gradually change into the great arid plains.

The northern parts of Michigan, Wisconsin, and Minnesota, are densely timbered, the surface for the most part being level or rolling, with frequent lakes and ponds, which, in the State last mentioned, are so abundant as to give that part of the State a lacustrine character. Southern Missouri is hilly and uneven; in some parts, almost mountainous.

The monotonous roll of the Great Plains extends over the western parts of Kansas, Nebraska, nearly all of Dakota, and the eastern parts of Montana, Wyoming, Colorado, and New Mexico. These plains form the eastern incline, or slope, of the great Cordilleran Plateau, which extends thence to the Sierra Nevada and the Cascade Range, and bears upon its broad summit the multitudinous ranges which are collectively known as the Cordilleras of North America. Of these the foremost rank is occupied by that system so well known as the Rocky Mountains. This system, with its mountain valleys and its outlying plateaux, occupies nearly all of the western parts of Montana, Central Wyoming, Colorado, and New Mexico, with the eastern and northern parts of Idaho. The western portions of New Mexico, Colorado, and Wyoming, with Eastern Utah, and nearly all of Arizona, are included in the Plateau Region—a strange and peculiar country. It is made up of plateaux, level or sloping gently, breaking off here and there to lower levels, by abrupt cliffs thousands of feet in height. It is a dry, arid region, with few streams; but these few have

cut deep below the surface, and flow far down in dismal cañons. Plant and animal life are poor and sparse.

Another and yet even more desert region succeeds this. On the west of the Wahsatch and its subsidiary ranges, in Central Utah, we enter the Great Basin, whose scanty waters flow to neither ocean, but are absorbed by the thirsty soil and by the atmosphere. This region covers Eastern Utah, nearly all of Nevada, Southeastern California, and Southern Idaho and Oregon. It is traversed by numerous narrow, abrupt ranges of mountains, the "Basin Ranges," alternating with narrow valleys. These valleys, except in a few cases, are very deserts, while most of the mountains are but a slight remove from the general condemnation. Entering our Territory from British Columbia, and stretching southward through Central Washington and Oregon and Eastern California, into the peninsula of Lower California, is a broad, massive range, known in the first two as the Cascade Range, in the last State as the Sierra Nevada. West of it is a broad valley, or trough, extending across the three States. In Oregon, this is occupied in part by the Willamette; in California, it is the great valley occupied by the Sacramento and San Joaquin Rivers. The western wall of this valley is the Coast system of ranges, beyond which roll the billows of the Pacific. Such, geographically, is the territory I propose to discuss. In 1800 only two (Ohio and Indiana) of the ten Prairie States, which now have a population of seventeen million two hundred and twenty-nine thousand eight hundred and ten, had any distinctive white population at all*—the balance being mainly a vast, unpopulated region, the silence of which was only broken by rushing torrents, the lowing of buffaloes, the howling of the wind, and the yell of the savage. Since then the growth has been steady and rapid, until, in 1880, Ohio and Illinois each has a population of over three million; Missouri exceeds two million; Indiana has nearly reached a million; and Michigan, Iowa, and Wisconsin will average one million and a half each. To-day the population of young Kansas must exceed a million; and, by the next census, every one of these ten great States will be in the million column in population.

The following table shows the population of the ten Prairie States for each decade of the present century:

* Indiana included at that time the French and the trading posts northwest of Ohio; and those about St. Louis were not then in the territory of the United States.

POPULATION OF THE TEN PRAIRIE STATES.

States.	1890.*	1870.	1860.	1850.	1840.
Ohio	3,198,239	2,665,260	2,339,511	1,980,329	1,519,467
Indiana	1,978,362	1,680,637	1,350,428	988,416	685,866
Illinois	3,078,769	2,339,891	1,711,951	851,470	476,183
Michigan	1,636,331	1,184,059	749,113	397,654	212,267
Iowa	1,694,620	1,194,020	674,913	192,214	43,112
Wisconsin	1,815,490	1,054,670	775,881	305,391	30,945
Minnesota	790,806	439,706	172,023	6,077	.....
Missouri	2,168,804	1,721,295	1,182,012	682,044	383,702
Kansas	995,966	364,399	107,206	.....	.....
Nebraska	452,453	122,993	28,841	.....	.....
Totals	17,229,810	12,966,930	9,091,879	5,403,595	3,351,543
Totals United States	50,152,866	38,[illegible]8,371	31,443,321	23,191,876	17,069,453

States.	1830.	1820.	1810.	1800.
Ohio	937,903	581,295	230,760	45,365
Indiana	343,031	147,178	24,520	5,641
Illinois	157,445	55,162	12,282	.....
Michigan	31,639	8,765	4,762	.....
Iowa	.....	.....	.....	.....
Wisconsin	.....	.....	.....	.....
Minnesota	.....	.....	.....	.....
Missouri	140,455	66,537	20,845	.....
Kansas	.....	.....	.....	.....
Nebraska	.....	.....	.....	.....
Totals	1,610,473	858,957	293,169	51,006
Totals United States	12,866,020	9,633,822	7,239,881	5,308,483

Illinois and Michigan, the former with a population of 12,282, and the latter of 4,762, and Missouri, with a population of 20,845, appear for the first time as separate Territories in 1810. The total population of the West at the close of this decade had increased to 293,169. Ten years later it had increased to 858,957. In 1830, Ohio, Indiana, Illinois, Michigan, and Missouri were still the only Prairie States chronicled as having any population; and the total population of all five of these States at this time was much less than the present population of Iowa, which was not then included in the census at all. Ten years later Iowa contained a population of 43,112. In 1840, Iowa and Wisconsin were added to the five; the former, as

* See Appendix for revised Census.

shown, having about forty-three thousand population, and the latter nearly thirty-one thousand. Another ten years, and Minnesota appears, with a population of 6,077; in 1860, Kansas and Nebraska—the population of the former having risen, in the decade, to upward of one hundred and seven thousand, and the latter to nearly twenty-nine thousand. The rapidity of this prodigious growth in population can better be realized by a glance at Diagram IX., on page 28.

The rate of growth of the western portion of the United States, including the Pacific States and Territories, has exceeded that of any other section of the country, as is clearly demonstrated by the following table, which shows the population of the four geographical sections of the country from 1790 to 1880:

POPULATION OF THE FOUR GEOGRAPHICAL SECTIONS.

Years.	New England States.	Middle States.	Southern States.	Western States.	Totals.
1790	1,009,408	1,337,456	1,582,350	.....	3,929,214
1800	1,233,011	1,823,479	2,201,987	51,006	5,308,483
1810	1,471,973	2,491,945	2,982,794	298,109	7,239,821
1820	1,659,579	3,210,182	3,905,104	856,957	9,633,822
1830	1,954,717	4,151,996	5,144,296	1,610,473	12,860,709
1840	2,234,822	5,118,076	6,358,913	3,351,549	17,063,359
1850	2,728,116	6,624,988	8,256,359	5,582,413	23,191,876
1860	3,135,283	8,333,330	10,259,016	9,715,692	31,443,321
1870	3,487,924	9,848,415	11,250,411	13,971,621	38,558,371
1880*	4,010,438	11,756,508	15,254,115	19,131,810	50,152,966

The rate of growth of these respective sections can better be understood by the subjoined table, which shows the percentage of increase in the four sections:

PERCENTAGE OF INCREASE.

Years.	New England States.	Middle States.	Southern States.	Western States.
1800	22	36	39	.....
1810	19	26	35	474
1820	12	24	30	193
1830	17	29	31	87
1840	14	23	23	120
1850	23	29	29	67
1860	14	25	24	74
1870	11	18	9	43
1880	14	19	35	36

A careful examination of the above shows that the New England States increased twenty-two per cent. in the decade

* See Appendix for revised Census.

ending in 1800; that the Middle States increased thirty-six per cent.; and that the Southern States increased thirty-nine per cent. At that time there was but a nominal population in the northwestern portion of the continent, from the eastern boundary line of Ohio to the Pacific coast on the west, and from the Northern Lakes to the Ohio river on the south. In 1810 the percentage of increase in the Eastern States was nineteen; in the Middle States, thirty-six; in the Southern States, thirty-five; and in the Western States, four hundred and seventy-four per cent. When the westward movement of the population began, the decennial increase in the New England, Southern, and Middle States, decreased; in 1820, the increase was twelve per cent., twenty-four per cent., and thirty per cent., respectively, and in the Western States no less than one hundred and ninety-three per cent. In 1830 the three divisions first mentioned remained about the same, and the percentage of increase dropped in the Western States to eighty-seven per cent. In the decade ending in 1840 westward emigration received an impetus (possibly owing to the commercial distress in the cities of the country), while the increase in the New England States remained normal, at fourteen per cent., and the Middle and Southern States decreased to twenty-three per cent. each, and the percentage in the Western States increased to one hundred and twenty per cent. In 1850 the manufactories of the New England States began to attract immigration; and the increase in population for the decade ending in that year was twenty-two per cent., against twenty-nine per cent. each in the Middle and Southern States, and only fifty-seven per cent. for the Western States and Territories. In 1860 the New England States returned to their normal rate of increase, fourteen per cent.; the Middle States show an increase of twenty-five per cent.; the Southern, of twenty-four per cent.; and the Western States and Territories increased to seventy-four per cent. for the decennial period ending in 1860.

The civil war, and its attendant checks upon the growth of population, reduced the percentage of increase in the New England States, in the ten years ending in 1870, to eleven per cent.; in the Middle States to eighteen per cent.; and this cause, with the imperfect enumeration of the South, brings the percentage of increase in that division of the country down to nine per cent. The effects of the war were less felt in the

Western States; and the preceding table shows that the increase was about forty-three per cent. In 1880, the New England States were restored to their accustomed increase of fourteen per cent; the Middle States to nineteen per cent.; and the Southern States, owing to the cause before explained, showing within one per cent. the same increase (thirty-six per cent.) as the Western States and Territories.

Should the rate of increase in the population of this country continue at thirty per cent. for the next twenty-six years, it would have a population of 65,198,726 in 1890, of 84,758,344 in 1900, and of 100,896,020—or about double the present population—in 1906. If the West continues to grow at the rate of thirty-six per cent. per decade, its population would be nearly thirty-six millions in 1900, and nearly forty-six millions in 1906; at the same time, the New England States, at their growth of fourteen per cent., would have, in 1906, nearly six millions, and the Middle States nearly eighteen and a half millions. Owing to the defects in the enumeration of the population of the South in 1870, it would be unsafe to estimate the future growth of the Southern States. At the opening of the century the aggregate population of the Western States and Territories was less than one per cent. of the population of the entire country. To-day, it is over thirty-eight per cent. The increase of the per cent. of the population of the Western States to that of the country for each decade is shown in Diagram X., on page 28.

The area, as I have shown, of the entire territory, is 2,093,820 square miles; that of the United States is 3,025,600 square miles (exclusive of Alaska), or 1,936,384,000 acres. The total area of the West embraces not less than sixty-six per cent. of the entire United States. In brief, the thirteen original States have extended into an empire so vast in area that a territory only 6,000 square miles less than the entire area of those States has been given away to aid in building a railroad system which has united the Atlantic with the Pacific coast, the Northern Lakes with the Gulf, and proved a bond of union between the Eastern and the Western States. The population of half a century ago knew little of the extent of the goodly heritage to which they were born, and had not explored the fertile lands of the Great West. The area of the ten Prairie States, revised according to the Tenth Census, is as follows:

States.	Area, Square Miles.	Area, Acres.
Ohio	41,060	26,278,400
Indiana	36,350	23,264,000
Illinois	55,650	35,616,000
Michigan	56,243	35,995,520
Iowa	55,045	35,228,800
Wisconsin	56,040	35,865,600
Minnesota	83,365	53,353,600
Missouri	69,415	44,425,600
Kansas	82,080	52,531,200
Nebraska	76,855	49,187,200
Totals	616,755	394,738,200
Totals Pacific States and Territories	1,407,045	900,508,800
Balance of country	1,001,760	641,126,400
Grand Totals for United States	3,025,600	1,936,384,000

The comparison of this area with that of the principal European countries (Diagram XI., page 37,) gives a realizing idea of the magnitude of the ten Prairie States and of the other territory designated in this volume as "The West."

The Census returns of 1880 show that the male population is largely in excess of the female population in the Prairie States; Ohio, however, coming nearest to an equal division. It will be many years before all the Prairie States will reach this condition:

MALES IN EXCESS.

States.	Per Cent. of Excess.	States.	Per Cent of Excess.
Ohio	1.8	Wisconsin	7.0
Indiana	4.4	Minnesota	15.9
Illinois	6.4	Missouri	8.2
Michigan	11.8	Kansas	18.9
Iowa	9.3	Nebraska	20.3

During the last ten years the border States of Kansas and Nebraska and the Territory of Dakota show an increase in the percentage of females to males. A similar movement is very marked in most of the Territories, as in Arizona, Montana, Idaho, Washington, and Wyoming, and in the Pacific States of California and Nevada. In Colorado, however, this progress has been rudely interrupted by the great and rapid development of the mineral resources during the last two years, which has

drawn from every State a vast male immigration. Thus is woman exerting her influence as a civilizer; and, as the gloomy forests were cleared away by the hands of man, and the vast prairies were plowed and fenced, what was once a wild waste became ready for the habitation of man and the blessed influence of good wives, mothers, and daughters.

The larger part of the nearly eleven million immigrants that have landed in the United States during this century are distributed among the Western States and Territories, a large percentage of them in the ten thrifty Prairie States:

FOREIGN POPULATION.

States.	Per Cent.	States.	Per Cent.
Ohio	14	Wisconsin	44
Indiana	7	Minnesota	52
Illinois	23	Missouri	10
Michigan	31	Kansas	13
Iowa	19	Nebraska	27

The cause of this large proportion of foreign element in these States is apparent. Agriculture is the principal moving force; and Germans, Scandinavians, and Irish are the principal nationalities drawn over. In the extreme Western States and Territories, most of the immigration is due to mining; although agriculture and cattle raising play a very important part. The colored element is a very unimportant part of the population of the Prairie States:

COLORED POPULATION.

States.	To 100,000 Whites.	States.	To 100,000 Whites.
Ohio	2,535	Wisconsin	306
Indiana	2,011	Minnesota	201
Illinois	1,536	Missouri	7,169
Michigan	926	Kansas	4,337
Iowa	565	Nebraska	528

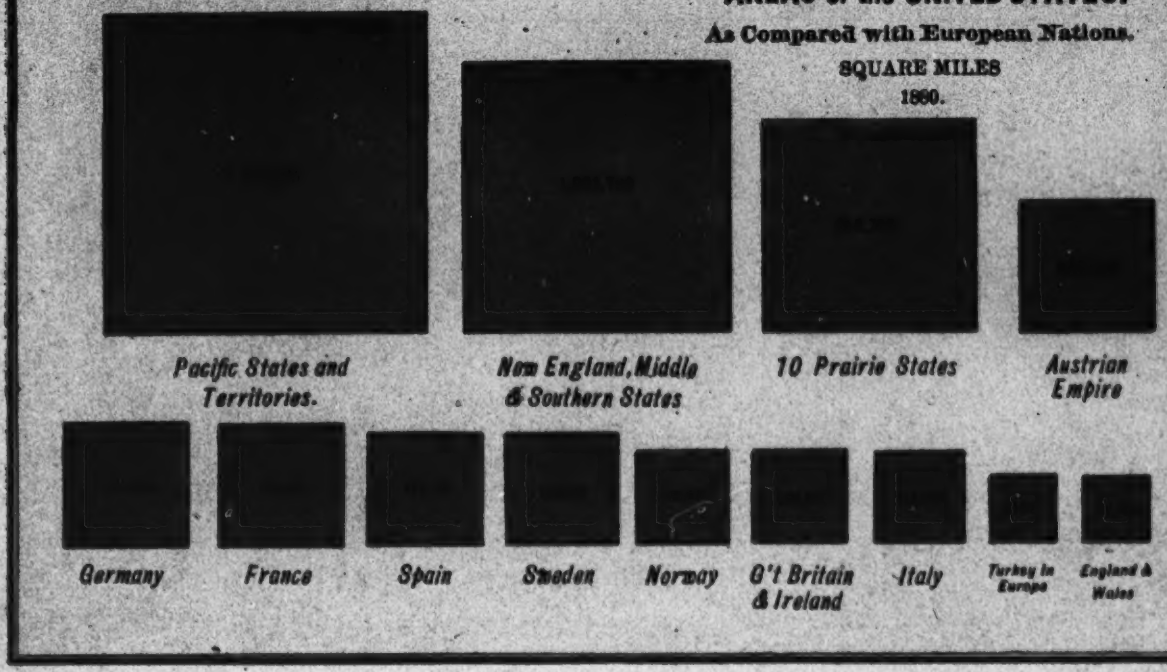
The Census has brought to light the fact that one-fifth of the inhabitants of this country live below one hundred feet elevation above sea level, more than two-fifths below five hundred, more than three-fourths below one thousand; while ninety-seven per cent. live below 2,000 feet. The interval between the five hundred and the one thousand feet contours comprises the greater part

Plate XI

AREAS of the UNITED STATES.

As Compared with European Nations.

SQUARE MILES
1860.



CEREAL PRODUCTS

Of the Five Geographical Divisions

Of the United States.

BUSHELS

1880.

of the Prairie States and the grain-producing States of the Northwest. East of the 98th meridian the contour of fifteen hundred feet is practically the upper limit of population, all the country lying above that elevation being mountains. During the last ten years the increase between one thousand and two thousand feet has been nearly fifty per cent. In this grade the effect of immigration in new and previously unsettled regions appears, as in parts of Kansas, Nebraska, Dakota, and Minnesota.

The foundation of the wealth and prosperity of these fair States, is, of course, their agricultural products, which have increased, as shown by the Census returns of 1860, 1870, and 1880, until they now reach over 1,907,000,000 bushels of grain, or over seventy per cent. of the total product of the United States:

TOTAL PRODUCTION OF CEREALS.

States.	1860. Bushels.	1870. Bushels.	Per Cent. Increase.	1880. Bushels.	Per Cent. Increase.
Ohio	108,789,675	123,478,204	13.49	188,993,077	53.09
Indiana	94,997,746	88,396,180	* 7.03	179,142,318	102.71
Illinois	156,543,565	207,996,491	32.88	444,622,320	113.82
Michigan	26,169,907	40,723,298	55.60	86,097,064	111.42
Iowa	57,613,564	121,951,917	111.67	363,497,131	198.72
Wisconsin	35,868,856	64,199,568	78.98	99,691,324	53.93
Minnesota	7,564,078	35,450,001	368.66	76,044,305	114.20
Missouri	81,504,669	97,796,389	19.98	248,699,405	154.46
Kansas	6,486,349	23,796,068	265.95	131,971,736	420.45
Nebraska	1,730,278	8,572,843	396.34	86,069,618	904.87
Totals	577,255,687	812,151,975	40.69	1,907,848,928	134.78
Total United States	1,229,039,616	1,387,295,533	12.87	2,697,962,456	94.56

The total cereal crops have nearly doubled in ten years. Minnesota, Kansas, and Nebraska in the first decade increased 368, 265, and 396 per cent., and in the second 114, 420, and 904 per cent., respectively. This gives some idea of the rapid development of agricultural industry. Even in Ohio the increase in the last decade was over 53 per cent., and in Indiana, Illinois, Michigan, Iowa, Wisconsin, and Missouri, 102, 113, 111, 198, 53, and 154 per cent., respectively. The per cent. of increase or decrease in the five geographical divisions in the two decades was as follows:

* Decrease.

CEREALS.

Sections.	Per Cent. Increase or Decrease, 1860 to 1870.	Per Cent. Increase, 1870 to 1880.	Per Cent. Increase or Decrease, 1860 to 1880.
New England States	*17.62	2.07	*10.69
Middle States	10.14	9.85	20.78
Southern States	*27.68	72.92	6.70
The Ten Prairie States	40.70	134.89	220.50
Pacific States and Territories	238.68	117.68	638.99
Averages for United States	12.87	94.53	115.89

The rate of increase or decrease, in each decade, of the corn and wheat crops of the ten Prairie States, as compared with the other sections of the country, may thus be summarized:

WHEAT AND CORN.

Sections.	1860 to 1870.		1870 to 1880.		1860 to 1880.	
	Inc. Per Ct. Wheat.	Inc. Per Ct. Corn.	Inc. Per Ct. Wheat.	Inc. Per Ct. Corn.	Inc. Per Ct. Wheat.	Inc. Per Ct. Corn.
New England States	*7.34	*19.82	22.63	18.99	11.72	8.60
Middle States	33.79	*1.00	*2.53	37.87	39.06	12.67
Southern States	*22.58	*31.52	54.34	40.04	16.13	11.43
The Ten Prairie States	105.00	8.11	67.75	192.29	243.90	215.98
Pacific States and Territories	175.11	74.52	94.18	123.71	499.03	288.30
Averages for United States	66.22	*9.28	63.16	130.61	165.43	109.21

From later tables, it will be seen that only three Prairie States (Ohio, 8.22; Indiana, 28.62; and Missouri, 9.4) show a decrease in corn product in the decade ending in 1870. Of the other States, Michigan and Illinois increased each about thirteen per cent.; Iowa, nearly sixty-three per cent.; Wisconsin, one hundred per cent.; Minnesota, sixty-one per cent.; Kansas, one hundred and seventy-six per cent.; and Nebraska, nearly twenty-two per cent.; making a total increase for the ten Prairie States of about eight per cent. During the same period the New England States decreased 19.82 per cent.; the Middle States, one per cent.; and the Southern States, 31.52 per cent. The other Western States and Territories show an increase of 74.52 per cent.; while the entire country shows a decrease of 9.28 per cent.

* Decrease.

In the decade from 1870 to 1880 all the Prairie States show an increase of from 65.80 per cent., in Ohio, to 1,278.87 per cent. in Nebraska. The other sections of the country, with the exception of the Pacific States and Territories, show comparatively small gains; while the per cent. of increase for the country at large is 130.61.

The increase of the wheat crop has not been so great for the last decade as it was between 1860 and 1870, the Census showing it at nearly sixty-eight per cent. Wisconsin is the only State that shows a decrease, owing to a partial failure of the crop of 1879. The average per cent. of increase of the Prairie States was 105 from 1860 to 1870, and 67.75 from 1870 to 1880, the average for the entire country for the same periods being sixty-six and sixty-three per cent. respectively. The amount of grain produced in these States, as compared with the rest of the United States, can best be realized by reference to Diagram XII., page 38.

Of the nearly 460,000,000 bushels of wheat raised in 1880 in the United States, the Prairie States produced over 326,000,000 bushels. The wheat product of these States, as shown by the Census for the last three decades, is given below; also the per cent. of increase in the last two decenniums:

WHEAT.

States.	1860. Bushels.	1870. Bushels.	Per Cent. Increase. 1860-70.	1880. Bushels.	Per Cent. Increase. 1870-80.
Ohio	15,119,047	27,883,159	84.41	46,014,869	65.00
Indiana	16,848,267	27,747,229	64.69	47,268,858	70.35
Illinois	23,337,033	30,126,405	29.09	51,110,502	69.69
Michigan	8,336,888	16,265,773	95.12	35,532,543	118.23
Iowa	8,449,403	29,435,699	248.37	31,154,205	5.15
Wisconsin	15,657,458	25,606,344	63.54	24,884,689	*2.81
Minnesota	2,186,993	18,866,073	762.65	34,601,060	83.41
Missouri	4,227,536	14,815,926	288.63	24,968,627	73.69
Kansas	194,173	2,391,198	1,131.48	17,394,141	624.49
Nebraska	147,667	2,125,096	1,187.16	13,847,007	551.60
Totals	95,004,155	194,763,878	105.00	326,720,466	67.75
Totals United States	173,104,894	287,745,626	66.23	459,479,505	63.16

A similar presentation in regard to the corn product reveals the fact that over 1,283,000,000 bushels of the total corn product of the United States is produced in these ten Prairie States:

* Decrease.

CORN.

States.	1880. Bushels.	1870. Bushels.	Per Cent. Increase. 1880-70.	1880. Bushels.	Per Cent. Increase. 1870-80.
Ohio	73,543,190	67,601,144	*8.22	111,877,134	65.50
Indiana	71,588,919	51,094,538	*28.62	115,493,200	126.08
Illinois	115,174,777	129,221,395	12.49	325,702,481	152.45
Michigan	12,444,676	14,066,220	13.19	33,461,459	180.70
Iowa	42,410,686	63,235,065	63.54	275,024,247	269.94
Wisconsin	7,517,800	15,063,998	100.00	34,280,579	127.69
Minnesota	2,941,959	4,742,117	61.22	14,831,741	212.49
Missouri	72,892,157	66,034,075	*9.40	202,485,723	206.48
Kansas	6,156,727	17,026,325	176.80	105,729,325	521.01
Nebraska	1,462,090	4,786,710	21.96	65,450,135	1,276.87
Totals	406,146,464	439,111,805	8.11	1,283,365,107	192.29
Totals United States.	838,792,742	760,944,549	*9.28	1,754,861,535	130.61

Two Diagrams, XIII. and XIV., pages 43 and 44, show, respectively, the relative wheat and corn product of the Prairie States to that of the other geographical divisions of the country.

The centres of production have closely followed the centre of population in its westward march, until now the Eastern, North Middle, and Southern groups of States do not supply their home demand for wheat. The South Middle States have a small surplus. The Ohio valley has a surplus of nearly half its crop; and the more western groups produce nearly fourfold more than their home demand. The wheat crop of thirty years ago was about one hundred million bushels, divided into equal volume by the eighty-first degree west of Greenwich; in 1859 the centre of production had advanced to the eighty-fifth degree; in 1869, to the eighty-eighth degree; and last year, it is safe to say, the enormous crop of nearly four hundred and sixty million bushels of wheat was divided equally by the ninetieth degree of longitude.

It has been said that the only hope for the British and the Russian farmers is in the high rates of transportation and the exhaustion of the soil of the Prairie States, through bad farming. The first question will be discussed farther along. The following table shows, that, in States where ordinary care—such as rotation of crops and a fair quantity of manure—is given the soil, the average yield is higher than some writers are willing to admit:

*Decrease.

Plate XIII

WHEAT

Products of the Five Geographical Divisions

Of the United States.

BUSHELS
1880

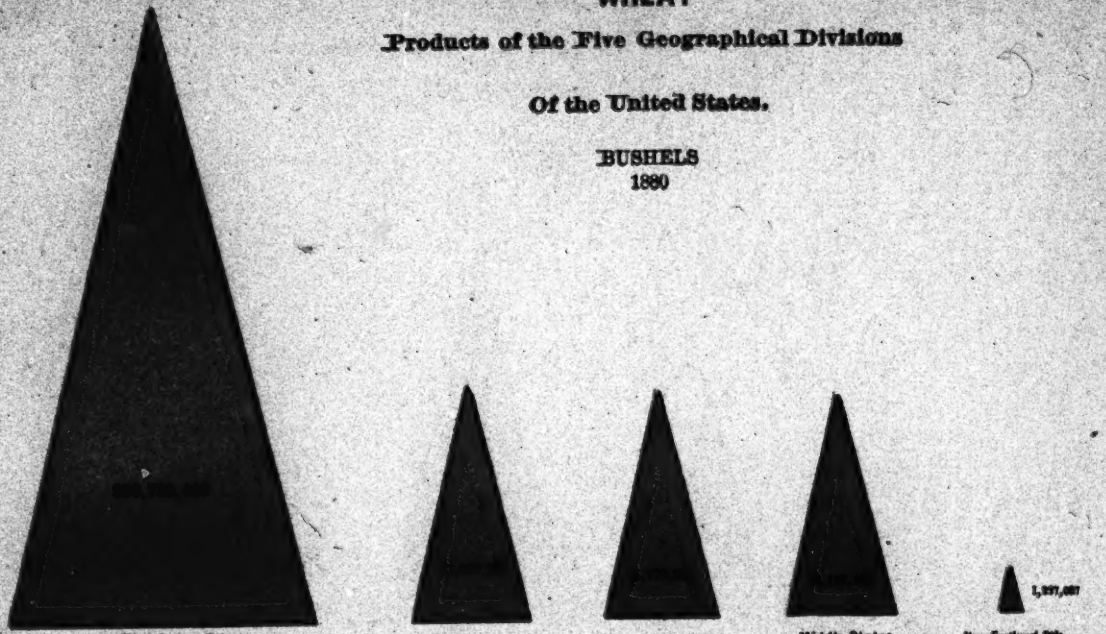


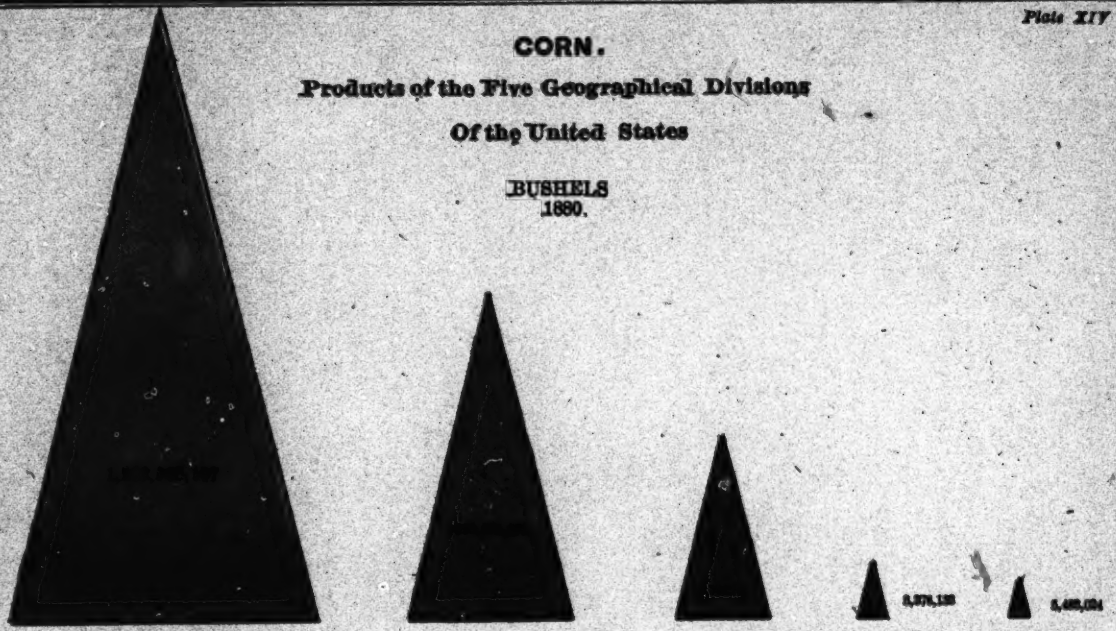
Plate XIV

CORN.

Products of the Five Geographical Divisions

Of the United States

BUSHELS
1880.



ACREAGE AND AVERAGE YIELD OF WHEAT.

States.	Acres.	Bushels.	Average.
Ohio	2,556,184	46,014,869	18.80
Indiana	2,619,695	47,266,858	18.09
Illinois	3,218,543	51,110,502	15.84
Michigan	1,822,749	35,532,542	19.49
Iowa	3,049,288	31,154,205	10.21
Wisconsin	1,948,160	34,884,689	19.77
Minnesota	3,044,670	34,601,080	11.36
Missouri	2,074,894	24,966,637	13.04
Kansas	1,861,402	17,334,141	9.31
Nebraska	1,469,865	13,847,007	9.42
Totals	23,664,890	336,720,446	13.80

The Census figures in relation to crops clearly demonstrate the fact that the population of the older States is overtaking their food-producing capacity. This generation has witnessed the movement of the centre of corn production from the South to the West; and of wheat from the Middle States to the far West—and yet the possibilities of our agricultural interests are, as yet, an unknown quantity. With the exception of Ohio, the Prairie States have not done much in tobacco culture, as the following denotes:

TOBACCO CROP OF 1880.

States.	Acres.	Pounds.	Pounds per Acre.
Ohio	34,678	34,735,295	1,002
Missouri	15,591	12,015,657	774
Wisconsin	8,811	10,008,428	1,204
Indiana	11,955	8,872,843	742
Illinois	5,612	3,985,236	701
Totals	76,574	70,167,963	939
Totals United States	638,841	472,661,159	741

The importance of the cattle industries of each State and Territory will receive especial attention in the detailed chapters. Unfortunately it has only been possible to obtain the Census figures for this important industry for the States and Territories west of about 95° longitude. The following figures are taken from the Agricultural Report for 1879, and are a fair approximation of the number and average price of the horses, mules, cows, cattle, sheep, and hogs in the ten Prairie States:

Animals.*	Ohio.	Indiana.	Illinois.	Michigan.	Iowa.	Totals.
Number horses	811,300	668,000	1,078,000	293,300	775,400	3,707,000
Average price	$97.56	$94.00	$91.00	$79.00	$90.10	.....
Number mules	34,500	38,000	103,000	4,400	44,700	225,500
Average price	$80.00	$80.76	$80.04	$66.70	$79.80	.....
Number cows	788,800	436,800	625,400	415,900	794,200	3,271,100
Average price	$34.44	$35.00	$33.66	$36.05	$34.37	.....
Number cattle	742,800	756,600	1,225,300	432,800	1,270,400	4,388,300
Average price	$26.37	$24.05	$21.09	$23.51	$19.44	.....
Number sheep	4,000,400	1,013,000	1,110,900	1,856,400	464,400	8,444,100
Average price	$2.62	$2.29	$2.00	$2.76	$2.54	.....
Number hogs	2,903,100	2,196,000	3,302,900	588,200	2,775,400	11,765,600
Average price	$4.61	$4.70	$3.61	$4.78	$3.36	.....

	Wisconsin.	Minnesota.	Missouri.	Kansas.	Nebraska.	Totals.
Number horses	686,100	274,500	626,900	233,700	178,100	1,782,300
Average price	$80.24	$64.80	$40.27	$46.02	$64.34	.....
Number mules	5,900	7,200	191,900	57,000	15,200	280,200
Average price	$72.80	$66.21	$47.58	$46.02	$57.80	.....
Number cows	493,800	204,000	626,800	231,400	142,000	1,698,000
Average price	$27.79	$25.18	$19.91	$20.68	$23.60	.....
Number cattle	582,900	382,400	1,648,300	647,700	488,000	3,749,300
Average price	$17.62	$17.44	$17.47	$20.32	$21.69	.....
Number sheep	1,316,100	497,500	1,220,300	371,900	172,800	3,581,600
Average price	$2.39	$2.13	$1.66	$2.25	$2.76	.....
Number hogs	571,900	194,200	2,682,400	1,208,700	666,700	5,323,900
Average price	$3.07	$3.39	$2.44	$3.66	$3.21	.....

To give some idea of the extent of the fishing interests of the Great Lakes, the following table has been compiled. The table shows the number of fishermen, value of apparatus, pounds of fish, and value of same, in 1879. in the fisheries of each State bordering on the Great Lakes:

States.	No. of Fishermen.	Value of Apparatus.	Total Pounds of Fish.	Total Value of Fish.
Minnesota	35	$ 10,160	178,000	$ 5,800
Wisconsin	800	223,840	10,194,600	276,695
Michigan	1,781	443,635	24,013,100	711,695
Illinois	300	88,400	2,997,500	82,000
Indiana	52	29,360	1,178,500	33,620
Ohio	1,046	473,800	24,284,300	355,000
Pennsylvania	114	24,700	1,258,000	42,480
New York	922	50,050	4,070,000	175,100
Totals	5,050	$1,345,975	68,742,000	$1,652,900

Of the 68,742,000 pounds of fish taken in the lake fisheries of these States, 21,463,900 were whitefish; 6,804,600, trout; 15,356,300 herring; 7,012,100, sturgeon; 6,722,600, hard fish; 7,086,700, soft fish; 48,000, rough fish; 2,302,400, coarse fish; and 1,950,400, mixed fish. The following table shows the number of men engaged in the fisheries of each of the Great Lakes, the value of their apparatus, the pounds of fish taken, and the value:

* See Appendix.

Lakes.	Total No. Fishermen.	Total Value of Apparatus.	Total Pounds of Fish Taken.	Total Value of Fish.
Superior	414	$ 81,260	2,816,625	$118,370
Michigan	1,979	551,125	22,141,875	665,400
Huron and St. Clair	978	155,910	11,586,300	293,550
Erie	1,470	503,500	26,697,300	412,680
Ontario	619	54,080	2,940,000	159,700
Totals	5,060	$1,345,975	66,782,600	$1,653,900

Elsewhere in this volume, some interesting facts in regard to the railroad and water transportation from the Northwest will be brought together. For the present, attention will be merely directed to the remarkable increase in the miles of railroad since the year 1840:

MILES OF RAILROAD.

States.	1840.	1850.	1860.	1870.	1875.	1877.	1878.	1879.	1880.
Ohio	78	575	2,946	4,523	4,977	4,979	5,151	5,321	5,621
Indiana	16	212	2,163	4,040	4,088	4,087	4,156	4,256	4,369
Illinois	24	110	2,790	6,578	7,021	7,284	7,448	7,570	7,910
Michigan	117	343	1,849	3,643	3,776	3,677	3,598	3,673	3,688
Iowa		192	655	1,683	2,160	4,154	4,368	4,779	5,396
Wisconsin		1,013	905	1,912	2,265	2,763	2,859	2,889	3,159
Minnesota		111	326	1,053	1,600	2,154	2,525	2,656	3,141
Missouri		205	817	1,817	2,145	2,768	2,998	3,740	4,698
Kansas		49	1,501	2,459	2,580	2,582	2,627	2,755	3,488
Nebraska		220	702	1,587	1,917	1,962	1,944	1,984	2,612
Totals	234	12,247	32,492	52,337	54,000	55,611	57,056	60,000	68,000

The Prairie States are growing more important every year in manufacturing; and, in industries where recent and reliable data can be obtained, it will be seen that the strides made within the past few years are surprising, and worthy of the most careful consideration of political economists. In 1878 the State of Illinois alone made as many rails as the whole United States made in any one year prior to 1860. The four States of Illinois, Wisconsin, Indiana, and Kansas, produced, in 1879, 266,783 tons of rails, upwards of thirty per cent. of the quantity of rails produced in the United States. Illinois and Indiana alone produced half a million tons of cut nails—over one-ninth of the total production of the country. The spring of the present year witnessed the completion of new rail manufactories in Colorado; at Omaha, Neb.; and Centralia, Ill. The total production of iron and steel of all kinds in the United States for 1880

was 7,265,140 tons. Of this, Ohio, Indiana, Illinois, Michigan, Wisconsin, Missouri, Minnesota, Kansas, and Nebraska, produced 1,912,689 tons:

Prairie States.	Number of Establishments in the Census Year 1880.	Capital Invested in the Census Year 1880.	Hands Employed and Wages Paid in the Census Year 1880.				
			Males above 16 Years.	Males below 16 Years.	Females below 15 Yrs.	Total Hands.	Total Amount Paid in Wages.
Ohio	134	$25,141,294	18,885	1,171	15	20,071	$8,265,070
Indiana	13	2,283,000	1,883	165	.....	2,048	864,921
Illinois	21	6,460,690	4,887	286	.....	5,253	2,508,718
Missouri	22	2,152,472	2,989	150	.....	3,139	734,575
Michigan	23	4,175,886	3,054	35	.....	3,089	923,597
Wisconsin	9	2,843,218	2,068	65	.....	2,153	1,004,921
Minnesota	1	150,000	180	.....	.....	180	25,275
Kansas	3	480,000	570	60	.....	630	166,500
Nebraska	1	100,000	90	10	.....	100	50,000
Totals	234	$50,755,990	34,626	2,022	15	36,663	$14,542,587

Prairie States	Value of all Materials Used in the Census Year 1880.	Value of all Products Made in the Census Year 1880.	Weight of all Products Made in the Census Year 1880.	Weight of all Products Made in the Census Year 1870.
Ohio	$23,997,915	$34,918,860	930,141	442,768
Indiana	2,226,073	4,551,406	96,117	64,148
Illinois	14,977,145	20,545,289	417,967	95,761
Missouri	3,249 553	4,660,530	125,758	94,890
Michigan	3,279,490	4,591,613	142,716	87,679
Wisconsin	3,330,667	6,590,391	178,985	42,234
Minnesota	.....	.....	.....	.....
Kansas	734,245	1,004,100	19,055	.....
Nebraska	114,500	82,000	2,000	.....
Totals	$53,476,528	$76,923,686	1,912,689	763,480

The ore in the iron regions of Michigan and Missouri is very rich, and free from injurious ingredients, and is capable of being successfully employed for the manufacture of all varieties of iron and steel. Professor Newberry,* one of the best authorities on the subject, has observed that in these two iron districts the inhabitants of the valley of the Mississippi have a supply of remarkably rich and pure ores, which is not likely to be exhausted for some hundreds of years, and which, from the small amount of phosphorus which they contain, will be the chief dependence of the American people for the manufacture

* "Iron Resources of the United States:" *International Review*, Nov., 1875.

of steel. To Chicago, Milwaukee, Cleveland, and other points on the shores of the Great Lakes, the ore of the Lake Superior iron regions is floated cheaply, and is manufactured where disembarked, or is distributed through the interior of Illinois and the neighboring States, to be brought in closer proximity to the coal. Already an immense iron rail industry, second only to that of Pennsylvania, has grown up, based on the relations, which have been briefly indicated, between the ore and coal. The increase of population on the shores of these lakes within the past quarter-century is without parallel in history; and twenty-five years more will witness a still greater growth. The present indication is that the demand for iron will be greater than ever before, and will be met by the Western instead of by the Eastern manufactories. This demand, according to Professor Newberry, must be furnished from three points or lines of manufacture: first, near the mines, where a limited quantity of iron will be produced with charcoal, and coke or coal brought as return freight; second, along the shores of lakes, where the ore is transshipped and meets the coal from the interior, as in Chicago; third, in the vicinity of the coal mines, to which the ore is brought overland by rail, as at Springfield and at Joliet. Neither of these points or lines can monopolize the iron manufacture; since return freights must be furnished to empty coal cars as well as to empty ore vessels. The preponderance of the lake shores or the interior will be determined mainly by the point to which economy of fuel can be carried in our iron manufacture. With keen foresight and enterprise, the West, and especially Illinois, has taken the newest and now most profitable branch of the iron trade—the manufacture of steel rails. In the manufacture of Bessemer-steel rails, Cook county, Illinois, has already distanced Alleghany county, Pennsylvania. In 1878, that great centre of the iron trade manufactured 72,246 tons of Bessemer-steel rails. Chicago, during the same time, turned out 123,000 tons; and, if the neighboring county of Will is counted in, the amount is increased to 178,000 tons, or 33,608 tons more than twice the entire production of Alleghany county. The same year the State of Illinois produced nearly one-third of all the Bessemer-steel rails produced in the United States. In other branches of industry the same holds true. A few years ago all our best furniture came from Boston. A leading Chicago furniture dealer said to me recently, "Not one

dollar's worth is now bought east of Grand Rapids, Mich." The leading hotel at Dundee, Scotland, is furnished from top to bottom with furniture made at Grand Rapids, delivered in Scotland twenty-five per cent. cheaper than it can be produced there. A small town in Indiana recently completed a large order for wagons for an English firm, who reship them from Liverpool to South Africa. The proprietor of a Chicago nail works said, "I remember the time when the first nail factory was built outside of Pittsburg. The people of Pittsburg smiled; for they thought nails could not be made outside of that smoky town. But the enterprise succeeded; and, as far west as Omaha, nails are being made to compete with the East."

It will be seen from these facts that the simplification of machinery and the improvements in the combustion of coal for the utilization of a larger portion of force contained in each ton, combined with increased railroad advantages, tend to make great manufacturing interests less and less dependent on location, and more and more dependent on what Edward Atkinson appropriately calls the "finer points." "It is not," says that gentleman, "many years since a young man came to New England from the far West to visit the works where plows were made: he told the New England craftsmen that they did not fully understand the nature of the prairie soil, that they had not calculated the true curves of least resistance, and that he intended to establish a plow factory on the Mississippi. They did not much fear his competition; but his great factory, employing hundreds of workmen, now furnishes plows even for the Eastern use." There are many other instances where the West has stolen a march upon the East. When at a small town in Indiana, a short time since, I saw forty car loads of plows, from one factory, pulled out of the depot. The inventor of that plow, a Western man, has given to millions of agriculturists the most important improvement of our century, in the American plow. It is by watching the finer points that our Prairie States have gained their present foothold in manufacturing; and upon these finer points their future in this line largely depends. Science has been brought to bear; and all the leading iron establishments have laboratories connected with their works, and salaried chemists. I know of a dozen firms in the West that have each spent from $10,000 to $50,000 within the past few years making elaborate experiments to better the quality of the mouldboards of plows.

I have selected the Western States, including California, in which the manufacture of glass is carried on, and in the following table show the number of establishments, the capital employed, the number of pots, the number of hands engaged, the amount of wages paid, and the value of the product in each State:

States.	Number of Establ'm'ts.	Capital.	No. of Pots.	No. of Employes.	Value of Material.	Wages Paid.	Total Cost Value of Products.
Plate Glass.							
Indiana	2	$1,142,000	64	513	$298,783	$160,850	$496,400
Missouri	1	1,150,000	16	350	112,295	120,000	335,000
Totals	3	$2,292,000	80	863	$411,028	$280,850	$831,400
Window Glass.							
Illinois	3	$200,000	48	225	$101,474	$145,703	$373,343
Indiana	1	175,000	30	169	105,000	103,000	229,397
Iowa	1	25,000	8	.....	.....	.....	.....
Michigan	1	65,000	8	54	25,113	30,000	90,000
Missouri	1	40,000	14	48	27,706	32,000	68,000
Ohio	5	410,000	46	273	106,510	146,661	358,000
Totals	12	$915,000	154	769	$375,803	$457,564	$1,118,740
Glassware.							
Illinois	1	$ 20,000	16	.....	.....	.....	.....
Iowa	1	12,000	7	35	$ 3,248	$ 2,000	$ 3,500
Missouri	2	100,000	21	217	43,085	61,339	126,497
Ohio	8	484,750	153	1,225	309,270	452,659	1,076,320
Totals	12	$616,750	197	1,477	$345,603	$515,998	$1,216,307
Green Glass.							
California	1	$ 75,000	7	113	$ 48,070	$ 45,924	$103,393
Illinois	2	190,000	36	507	196,368	196,324	538,000
Indiana	1	125,000	14	180	80,000	20,357	64,984
Missouri	2	140,000	24	350	168,205	167,750	392,790
Ohio	3	139,000	24	190	43,553	45,000	115,000
Totals	9	$669,000	105	1,340	$486,196	$475,364	$1,204,167

From the above table, it will be seen, that, of the $19,415,590 of capital invested in the glass factories of the United States, $4,492,750, or nearly one-quarter, is invested in the Western States; while 4,449 of the 23,882 persons engaged in this indus-

U. OF ILL. LIB.

try are employed in the glass manufactories of the Western States. No less than $2,292,000 out of the $2,587,000 capital invested in the manufacture of plate glass is located in two Prairie States. Of the $4,873,155 of capital employed by the window-glass manufactories of the United States, $915,000 is located in the West; while Pennsylvania has no less than twenty-one of the establishments, and employs $2,279,000 capital.

It has been impossible to secure absolute returns in regard to the industries of all the States. In many cases, I have been enabled to give, approximately, the total number of the principal industries, the value of the material used, the number of hands employed, the amount of wages paid, and the annual product. In Indiana, the figures relating to manufacturing are borrowed from the report of Mr. John Collett, the State statistician. He estimates the number of establishments at 14,480, the capital invested at $76,341,728, the amount of wages paid at $24,195,057, materials consumed at $97,342,880, and the products at upward of $185,000,000.

The statistics of the great lumber interests of Michigan are given in detail in the chapter on that State. In Iowa, I have been able to obtain very satisfactory statistics in regard to the manufactures, showing an increase in hands employed from 1,707, in 1850, to 39,863 in 1880; of capital invested from $1,292,875 to $31,409,470; and of total product from $3,551,783 to over $70,000,000.

In Wisconsin, Missouri, Ohio, and Illinois, the number of industries has been presented, but not in such complete form as in Iowa and some other States. Many of the facts in regard to the product of manufactures will be found in the chapter on the large cities. In Nebraska, the number of hands employed in manufacturing has increased from 386 to 7,281, while the capital invested has increased from about $266,500 to $4,348,780, and the products from $607,000 to over $16,670,000.

The table on the next page presents at a glance the progress of manufacturing industries in the ten Prairie States from 1850 to 1880. It exhibits the number of establishments in each State, the number of hands employed, the amount of capital invested, the amount of wages paid, the value of materials used and of the products manufactured. This table will enable the reader to appreciate the growing importance to the Prairie States of their manufacturing as well as agricultural and mining industries.

PROGRESS OF MANUFACTURING INDUSTRIES IN THE TEN PRAIRIE STATES.

States.	Year.	No. of Establishments.	No. of Hands Empl'd.	Amount Capital Invested.	Amount Wages Paid.	Value Materials Used.	Value Products Manufac'd.
Illinois*	1850	3,189	11,559	$ 6,217,765	$ 3,304,238	$ 8,998,227	$ 18,534,272
	1860	4,998	22,998	27,542,558	7,627,321	20,358,788	57,360,996
	1870	12,597	52,979	94,396,037	31,100,944	127,600,077	208,660,972
	1880	19,095	187,788	150,982,981	49,700,980	194,160,123	309,274,109
Indiana	1850	4,302	14,440	7,730,402	3,726,844	10,869,700	18,725,493
	1860	5,223	21,995	18,451,121	6,518,235	27,142,597	42,502,469
	1870	11,847	58,358	52,052,485	18,906,760	68,125,492	108,617,278
	1880	14,490	97,989	76,941,738	24,195,057	97,542,980	165,060,980
Iowa	1850	522	1,707	1,266,975	472,018	2,256,951	3,551,788
	1860	1,989	6,307	7,247,120	1,982,417	5,612,289	12,971,291
	1870	6,566	25,032	22,420,188	6,803,992	27,698,096	46,594,226
	1880	6,750	39,865	31,409,470	9,842,042	46,220,419	70,871,977
Kansas	1850	.....	.....	.....	.....	.....	.....
	1860	344	1,735	1,084,985	260,348	1,444,975	4,197,408
	1870	1,477	6,844	4,319,060	2,377,511	6,112,188	11,778,893
	1880	.....	15,174	10,183,800	3,789,198	20,132,227	30,409,696
Michigan*	1850	2,082	9,344	6,862,680	2,717,194	6,126,296	11,160,032
	1860	3,448	23,180	23,806,826	6,735,047	17,035,611	32,658,268
	1870	9,455	64,694	71,712,288	21,905,958	68,142,515	118,704,678
	1880	15,128	100,636	117,608,144	33,962,568	109,098,084	193,913,058
Minnesota	1850	5	68	94,000	18,540	94,300	58,300
	1860	782	2,122	2,366,310	712,214	1,904,070	3,878,172
	1870	2,270	11,250	11,968,750	4,052,227	13,842,908	23,110,700
	1880	6,810	34,999	38,388,441	12,158,511	41,289,708	76,365,810
Missouri*	1850	2,028	15,806	8,376,607	4,662,648	12,788,251	21,394,418
	1860	3,157	19,681	20,084,230	6,629,916	23,649,941	41,782,731
	1870	11,971	65,254	60,257,244	21,051,445	115,552,999	205,212,499
	1880	17,806	101,962	130,016,788	43,988,712	179,290,903	309,236,157
Nebraska	1850	.....	.....	.....	.....	.....	.....
	1860	107	336	208,375	105,818	297,815	607,288
	1870	670	2,883	2,168,988	1,499,913	2,938,674	5,725,132
	1880	1,377	7,381	4,348,780	1,716,879	11,308,597	18,970,680
Ohio*	1850	10,682	51,491	29,019,304	13,467,158	34,678,019	58,682,979
	1860	11,125	71,608	57,305,208	22,208,989	68,900,270	121,697,148
	1870	22,778	137,202	141,983,994	49,086,498	187,121,697	329,719,610
	18.0	34,189	212,686	200,730,254	68,893,085	219,964,276	356,513,137
Wisconsin*	1850	1,992	6,089	3,268,148	1,712,496	5,414,981	9,266,089
	1860	3,084	15,414	15,961,561	4,268,708	17,127,284	27,942,497
	1870	7,013	43,910	41,961,872	13,575,649	49,851,288	77,814,288
	1880	9,117	57,083	57,944,905	17,848,804	64,191,773	104,209,940

Manufacturing interests are bound to develop in and around the great iron and coal districts of the Prairie States, and near the great lumber regions. The farther the agriculturist pushes westward, where his labors are most liberally rewarded, the more important become the manufacturing industries of the West.

In presenting the last report of the coal trade, Mr. Frederick E. Saward called attention to an increase of ten million tons in the coal production of the United States over the tonnage reported the previous year. The United States has doubled the output of 1869. "It is noticed," says Mr. Saward, "that the

* In these States I have been obliged to make careful estimates for 1880, based on the actual returns from the large industrial centres, and the percentage of increase in former decades. Every possible care has been taken with the work; and I believe the final census returns will show that the estimates were approximately correct.

States of the West are using an immense quantity of coal of different kinds." The coal product of the Prairie States has also doubled, as the following table will show:

PRODUCTION OF COAL.

States.	1860.	1876.	1877.	1878.	1879.	1880.
Ohio	2,527,285	3,500,000	5,250,000	5,000,000	5,000,000	7,000,000
Indiana	437,870	950,000	1,000,000	1,000,000	1,000,000	1,196,490
Illinois	2,629,562	3,500,000	3,500,000	3,500,000	3,500,000	4,000,000
Michigan	21,150	30,000	30,000	30,000	35,000	35,000
Iowa	263,487	1,500,000	1,500,000	1,500,000	1,600,000	1,600,000
Wisconsin						
Minnesota						
Missouri	631,930	900,000	900,000	900,000	900,000	1,500,000
Kansas	82,988	125,000	200,000	300,000	400,000	550,000
Nebraska	1,425	30,000	50,000	75,000	75,000	100,000
Totals	6,535,648	10,535,000	12,430,000	12,305,000	12,510,000	15,981,490
Totals for U. S.	31,077,994	49,205,748	54,398,250	52,130,794	59,808,898	69,200,984

Chapter XXVI. of this volume will be devoted to a description of the commercial and industrial progress and development of the principal cities of the entire Western territory. For the present, it will be only necessary to allude briefly, in passing, to the rapid growth of the city population of the ten Prairie States, which demonstrates that the West is no longer given over to the staples of meat and grain, but is supplying a large share of the manufactures and commerce of the country. The progress of these centres of industrial energy will naturally suggest the inquiry, Is the West as promising a land to the manufacturer as to the agriculturist? The law of distribution depends upon the relative and not upon the absolute superiority of certain districts as settlements for labor. At first the superior agricultural advantages of this region delivered the country over to agriculture. Now, however, that manufacturing can be carried on cheaper, and labor is paid better, in proportion to the cost of living than in the Middle and Eastern States, the population naturally seeks the cities, and manufacturing enterprises are attracted. In 1860, the total population of all the cities in Illinois was but 227,761—less than half the present population of Chicago. The cities of Ohio then contained a population of 339,500, and those of Missouri, 183,867; while the total number of dwellers in the cities of Michigan, Wisconsin, and Indiana, respectively,

did not exceed 90,000. There are now in the Western States one hundred and sixteen cities of over 7,500 inhabitants. In 1860, these cities contained an aggregate population of 1,208,561; in 1870, of 2,375,709; and, in 1880, of 3,544,659. This shows a growth of ninety-six per cent. the first decade, and forty-nine per cent. the second. The following condensed table shows the percentage of growth of the cities in the ten Prairie States:

States.	1860.	1870.		1880.		Increase 1860 to 1880.
	Population.	Population.	Per cent.	Population.	Per cent.	Per cent.
Ohio	339,500	535,019	57	760,868	42	124
Indiana	90,218	181,801	102	252,823	39	180
Illinois	227,761	505,623	122	770,244	52	388
Michigan	94,007	180,989	93	279,409	54	197
Iowa	58,871	112,222	108	152,576	36	183
Wisconsin	92,698	149,388	61	227,988	53	146
Minnesota	17,808	44,412	149	107,647	142	504
Missouri	168,867	382,944	108	467,871	22	154
Kansas	12,449	39,037	213	55,618	42	347
Nebraska	1,881	18,524	885	43,529	135	2,213

From this it appears that Ohio, Indiana, Illinois, Michigan, Missouri, and Iowa show a steady and healthy increase; but the unexampled growth of St. Paul and Minneapolis the past ten years makes the rate of increase in city population more than three times greater in Minnesota than in Ohio, and more than four times greater than in Illinois. But does this building up of cities and manufactures deplete our farms? In 1790, about one-thirtieth of the population was in cities; in 1810, one-twentieth; in 1830, one-seventeenth; in 1860, one-eighth; in 1870, one-fifth and more; and to-day nearly one-quarter is in cities. In England, as Professor Jevons has ably pointed out, the towns, when great manufacturing industries began to develop, "engulfed the best blood of the rural districts;" and from that time the population in the agricultural counties began to decrease. Such is not the case in the United States. The sturdy population of the rural districts of the Eastern States is gradually migrating westward; but its place will be filled by foreign immigration. The agricultural communities of the entire West are benefited by the thriving towns which are fast spreading over the Prairie States. The United States is too extended for it to suffer as England has done from the population of the rural districts drifting into the cities.

I am indebted to the Comptroller of the Currency, Hon. John

Jay Knox, for the following statistics, showing the number of National banks in each of the Prairie States, and in their large cities, the amount of capital, and the individual deposits:

States and Cities.	June 11, 1880.			May 6, 1881.		
	No. of Banks.	Capital.	Individual Deposits.	No. of Banks.	Capital.	Individual Deposits.
Ohio	154	$18,401,900	$26,151,751.60	160	$18,799,000	$23,440,644.13
Cincinnati	6	4,100,000	8,231,901.77	7	5,100,000	10,464,296.22
Cleveland	6	2,700,000	5,609,268.53	6	2,700,000	6,663,012.30
Indiana	92	13,268,800	18,788,788.09	92	12,818,500	20,228,260.77
Illinois	127	19,714,600	24,373,498.26	129	19,784,660	30,905,705.14
Chicago	9	4,250,000	20,916,716.33	9	4,250,000	26,696,568.46
Michigan	75	7,218,260	11,097,089.44	75	7,295,000	13,061,668.61
Detroit	4	2,100,000	5,197,268.38	4	2,100,000	6,414,268.35
Wisconsin	32	2,400,000	5,000,504.83	31	2,275,000	7,441,276.97
Milwaukee	3	650,000	3,106,263.47	3	650,000	3,715,080.88
Iowa	74	5,777,000	11,811,391.21	74	5,750,000	14,714,480.73
Minnesota	30	4,050,000	8,236,451.41	28	4,385,000	10,115,251.04
Missouri	16	1,450,000	2,952,623.65	16	1,400,000	3,648,094.64
St. Louis	5	2,650,000	5,715,269.24	5	2,650,000	6,016,700.05
[illegible]	12	875,000	2,212,542.49	12	875,000	2,048,217.98
Nebraska	10	850,000	3,580,277.41	10	850,000	2,749,746 97
Totals	655	$68,039,250	$103,485,226.85	661	$84,228,160	$201,380,228.04

The following statement, compiled from the returns made to the Commissioner of Internal Revenue, gives by State and principal cities the capital and deposits of the State banks, trust companies, private banks, and savings banks, for each of the ten Prairie States, for the six months ending May 30, 1880, with the average amount of capital invested in United States bonds:

States and Cities.	No. of Banks.	Capital.	Deposits.	Invested in United States Bonds.		
				By State Banks, Private Banks, and Trust Companies.	By Savings Banks.	Totals.
Ohio	248	$5,704,140	$20,894,648	$ 867,475	$ 66,959	$ 934,434
Cincinnati	13	1,402,941	4,266,711	275,971	0	275,971
Cleveland	9	1,045,926	13,965,571	676,379	2,151,270	2,829,649
Indiana	144	4,965,484	18,172,788	807,953	42,081	850,034
Illinois	316	4,092,814	17,061,796	675,006	60,000	735,606
Chicago	34	4,272,495	12,564,068	2,559,823	0	2,559,823
Michigan	155	2,346,799	7,105,959	154,694	0	154,694
Detroit	14	1,096,041	7,544,048	345,742	134,267	480,009
Wisconsin	109	1,578,848	5,964,095	184,761	0	184,761
Milwaukee	9	634,731	7,798,900	15,914	0	15,914
Iowa	200	5,153,906	13,298,191	319,876	0	319,876
Minnesota	95	1,906,275	5,000,150	119,986	0	119,986
Missouri	170	4,250,175	15,307,216	428,926	0	428,926
Saint Louis	28	5,705,555	18,696,699	672,925	0	672,925
Kansas	148	1,564,144	4,877,150	90,297	0	90,297
Nebraska	83	653,990	2,019,814	39,492	0	39,492
Western States...	$1,983	$45,763,007	$169,633,732	$8,137,554	$2,474,527	$10,612,111

The distribution of the registered bonds of the United States is an interesting financial topic. Of the total number of owners of the four, four and a half, and five per cent. registered bonds, 10,415, or about one-seventh of them, reside in the ten Prairie States. There was a time when very few of the citizens of these Prairie States could be classed as bondholders; but to-day, as the following table shows, the West, besides having abundant banking capital, has a goodly share of its earnings invested in government securities:

Prairie States.	Totals.			Male.			Female.		
	Aggregate Number Holders of both Sexes.	Aggregate Amount Held by both Sexes.	Average per Capita.	Aggregate Number of Holders.	Aggregate Amount Held.	Average per Capita.	Aggregate Number of Holders.	Aggregate Amount Held.	Average per Capita.
Ohio	4,120	$16,445,050	$3.981.85	2,614	$13,097,250	$5,010.42	1,516	$3,347,800	$2,208.31
Indiana	696	3,960,800	5,708.15	467	3,269,200	7,000.42	231	711,600	3,080.51
Illinois	3,101	9,119,950	2,940.97	1,952	7,098,350	3,600.56	1,149	2,021,600	1,760.40
Michigan	453	1,941,300	4,285.30	309	1,409,300	4,560.51	144	532,000	3,694.44
Wisconsin	342	1,231,400	3,602.97	250	1,132,100	4,528.40	92	199,300	2,166.30
Iowa	268	1,205,450	4,542.28	201	904,950	4,502.23	82	300,500	4,640.94
Minnesota	94	420,250	4,470.74	63	280,650	5,156.61	28	99,600	3,676.92
Missouri	923	3,788,600	4,055.30	597	2,482,400	4,117.99	326	1,306,200	3,944.04
Kansas	326	1,185,800	3,646.62	232	997,350	4,492.56	94	191,450	2,081.70
Nebraska	55	245,750	4,382.72	40	227,250	5,606.25	15	20,500	199.25
Totals	10,415	$39,745,250	$3,816.15	6,720	$30,975,250	$4,587.70	3,695	$8,870,000	$2,407.05
Totals of States	71,587	$417,538,850	$5,832.61	42,992	$327,135,300	$7,741.84	29,395	$90,358,350	$3,081.10

Add to the great influx of immigration, the extraordinary agricultural development, the enlargement of commercial facilities, and the prosperity of all classes of industry, the fact that the number of failures and the amount of liabilities for the past five years have steadily declined, and the prosperity seems complete, if we do not lose prudence in prosperity. In 1875, there were, in the ten Prairie States, 2,290 failures, with liabilities amounting to nearly $35,500,000. The following year they reached 3,122, with liabilities upwards of $52,500,000. The next year, 1877, the liabilities amounted to over $56,000,000; and in 1878 to over $64,000,000. Since then there has been a remarkable decrease; in 1879 the failures only aggregating 1,608, and the amount of liabilities $21,207,000; while in 1880 they had dwindled down to 1,171, and the liabilities amounted to $11,500,000. The number of failures and the amount of liabili-

ties for the past six years, for each of the States, and also for the whole United States, will be found in the following tabulated statement:

FAILURES.

Prairie States.	1875.		1876.		1877.	
	No. of Failures.	Amount of Liabilities.	No. of Failures.	Amount of Liabilities.	No. of Failures.	Amount of Liabilities.
Ohio	388	$7,993,282	467	$ 8,606,342	499	$ 9,577,402
Indiana	332	4,804,052	362	4,787,401	352	5,718,700
Illinois	409	8,218,470	633	15,243,910	660	18,182,891
Michigan	288	4,123,718	576	9,736,852	310	8,082,902
Iowa	183	1,610,305	491	3,909,060	350	2,604,100
Wisconsin	245	2,180,346	209	4,307,314	154	2,128,710
Minnesota	140	1,803,406	132	1,565,684	114	1,291,853
Missouri	189	3,748,793	167	3,891,294	229	7,957,082
Kansas	88	829,400	48	435,900	50	355,635
Nebraska	38	197,400	37	93,600	45	338,300
Totals	2,290	$35,459,172	3,122	$52,577,277	2,756	$56,187,074
Balance of States	5,062	$157,882,267	5,584	$132,965,009	5,480	$120,553,677
Totals	7,740	$201,060,353	9,092	$191,117,786	8,872	$190,669,936

States.	1878.		1879.		1880.	
	No. of Failures.	Amount of Liabilities.	No. of Failures.	Amount of Liabilities.	No. of Failures.	Amount of Liabilities.
Ohio	731	$18,369,611	334	$4,407,875	190	$1,840,539
Indiana	374	5,233,549	122	1,509,791	89	842,847
Illinois	883	20,599,731	277	5,633,780	134	1,263,956
Michigan	389	6,627,709	179	2,063,894	153	2,285,266
Iowa	400	3,428,100	152	1,121,900	92	495,555
Wisconsin	163	2,317,382	145	1,886,345	74	580,907
Minnesota	149	1,052,403	128	1,241,697	82	1,807 969
Missouri	268	5,207,716	139	2,728,394	139	1,616,186
Kansas	44	647,902	66	392,043	112	446,953
Nebraska	106	825,400	66	221,800	106	359,919
Totals	3,436	$64,309,503	1,608	$21,207,519	1,171	$11,519,419
Balance of States	6,348	$156,910,453	4,336	$86,988,176	3,030	$49,°26,851
Totals	10,478	$234,383,132	6,658	$108,149,053	4,735	$65,752,000

Few things show the extent of the enterprise and commercial thrift of communities more conclusively than the amount of insurance. The following valuable table, compiled especially

for this chapter, shows the gross assets of the insurance companies of seven of the Prairie States, their gross liabilities, the amount of fire risks written during 1879, amounts of premiums received and losses paid:

Items.	Joint-Stock Companies Only.			
	Ohio.	Illinois.	Iowa.	Michigan.
Gross assets, Dec. 31, 1879	$123,966,981.99	$139,699,941.67	$139,688,447.65	$119,743,469.36
Gross liabilities, including capital, Dec. 31, 1879	98,115,619.73	96,345,092.17	94,535,958.74	96,069,675.99
Am't fire risks written during '79	4,126,581,858.08	670,889,926.96	114,981,081.94	161,899,490.79
Am't prem's rec'd during 1879	2,772,666.99	4,612,992.60	1,497,947.27	1,728,796.57
Am't losses paid during 1879	1,945,158.96	1,737,693.59	797,969.95	1,021,173.77

Items.	Joint-Stock Companies Only.		
	Missouri.	Wisconsin.	*Kansas.
Gross assets, Dec. 31, 1879	$188,095,770.68	$199,168,699.00	$66,271,454.00
Gross liabilities, including capital, Dec. 31, 1879	91,987,177.77	90,737,130.00	61,466,275.00
Amount of fire risks written during 1879	139,660,668.49	199,207,627.00	34,099,988.00
Amount of premiums received during 1879	1,956,944.04	1,445,685.00	538,594.70
Amount of losses paid during 1879	1,497,708.50	980,011.00	159,211.18

The present internal revenue system of the country makes the sources of its income, spirits, tobacco, fermented liquors, banks and bankers, and the sale of stamps for use in certain transactions, and on certain manufactures. Spirits paid nearly one-half of the whole; tobacco, more than one-fourth; fermented liquor, about one-tenth; banks and stamps, the rest. The corn belt, with its great distilleries, made the great payments on spirits. The tobacco and the tobacco manufactures of the Prairie States paid a large sum; and the bank tax of the Prairie States was a handsome fraction of the total for the country. The share paid on fermented liquors is also large in proportion to the rest of the country.

It is a fact often commented upon, that the ten Prairie States of the Union pay nearly half of the internal revenue of the United States; and this fact is borne out by the accompanying official statement, which shows the collections of internal revenue made in each of the ten States under discussion for the last eight years, and also the total amount of collections for the entire country. A careful examination of the table will show that the revenue annually received by the government from these ten States almost equals half of the entire collections:

* Fire and Fire Marine.

COLLECTIONS OF INTERNAL REVENUE.

States.	1873.	1874.	1875.	1876.
Ohio	$14,851,809.45	$14,226,411.15	$14,088,720.17	$16,397,909.61
Indiana	5,672,052.51	4,922,495.59	4,958,759.05	5,579,189.27
Illinois	16,406,169.54	15,419,720.89	17,684,698.71	20,720,694.19
Michigan	2,303,720.73	1,798,050.12	1,961,284.99	2,088,782.60
Iowa	1,012,997.30	925,251.16	1,240,217.69	1,212,617.94
Wisconsin	1,891,260.91	2,289,564.00	2,722,076.75	3,308,770.31
Minnesota	261,404.94	227,855.85	295,282.45	343,778.19
Missouri	4,268,260.15	4,525,456.05	4,394,575.31	2,961,941.51
Kansas	161,466.76	149,727.65	183,695.86	150,604.46
Nebraska	342,962.26	276,200.52	368,473.30	502,266.59
Totals	$47,013,227.45	$45,009,513.68	$47,894,111.09	$58,568,986.91
Totals United States	$106,228,537.51	$96,305,420.25	$102,771,264.60	$110,716,011.03

States.	1877.	1878.	1879.	1880.
Ohio	$13,474,689.79	$14,770,508.87	$17,584,587.08	$18,018,986.89
Indiana	6,06 ,220.27	5,710,887.56	5,851,108.88	6,213,636.49
Illinois	21,970,308.14	19,988,791.22	19,470,541.75	23,085,614.49
Michigan	1,821,888.09	1,603,808.34	1,654,043.34	1,811,797.99
Iowa	810,290.78	956,851.13	889,445.29	854,889.75
Wisconsin	2,987,439.69	2,481,801.98	2,687,602.80	2,998,516.79
Minnesota	236,461.70	276,038.75	305,709.78	344,689.64
Missouri	4,450,067.73	5,071,288.48	5,086,808.42	5,449,654.08
Kansas	199,763.33	113,257.50	176,985.57	236,734.01
Nebraska	602,734.86	599,021.37	876,309.51	912,734.86
Totals	$54,313,961.79	$51,742,305.99	$56,795,164.21	$59,413,197.12
Totals United States	$112,544,657.31	$104,717,290.36	$107,212,088.81	$116,848,219.80

The assessed valuation of property in these States, as reported to the Census office, for 1880, is as follows:

ASSESSED VALUATION.

States.	Real Estate.	Personal Property.	Totals.
Ohio	$1,102,677,704	$443,068,896	$1,545,746,600
Indiana	612,740,609	205,832,552	818,573,161
Illinois			* 786,616,394
Missouri	381,768,822	147,634,959	529,403,781
Michigan			† 505,643,747
Iowa	296,254,842	101,416,909	397,671,251
Wisconsin	344,788,721	94,183,030	438,971,751
Minnesota	203,473,637	54,581,906	258,055,543
Kansas	108,422,049	52,459,640	160,891,689
Nebraska	55,073,375	35,512,407	90,585,782
Totals	$3,105,209,259	$1,134,690,299	$5,532,159,699

* From Auditor's Report.

† These figures do not include the valuation of five counties (unreported). The average valuation reported per county is $702,363. A fair approximation of the valuation of whole State can be obtained by adding five times that sum ($3,511,815) to figures given in table.

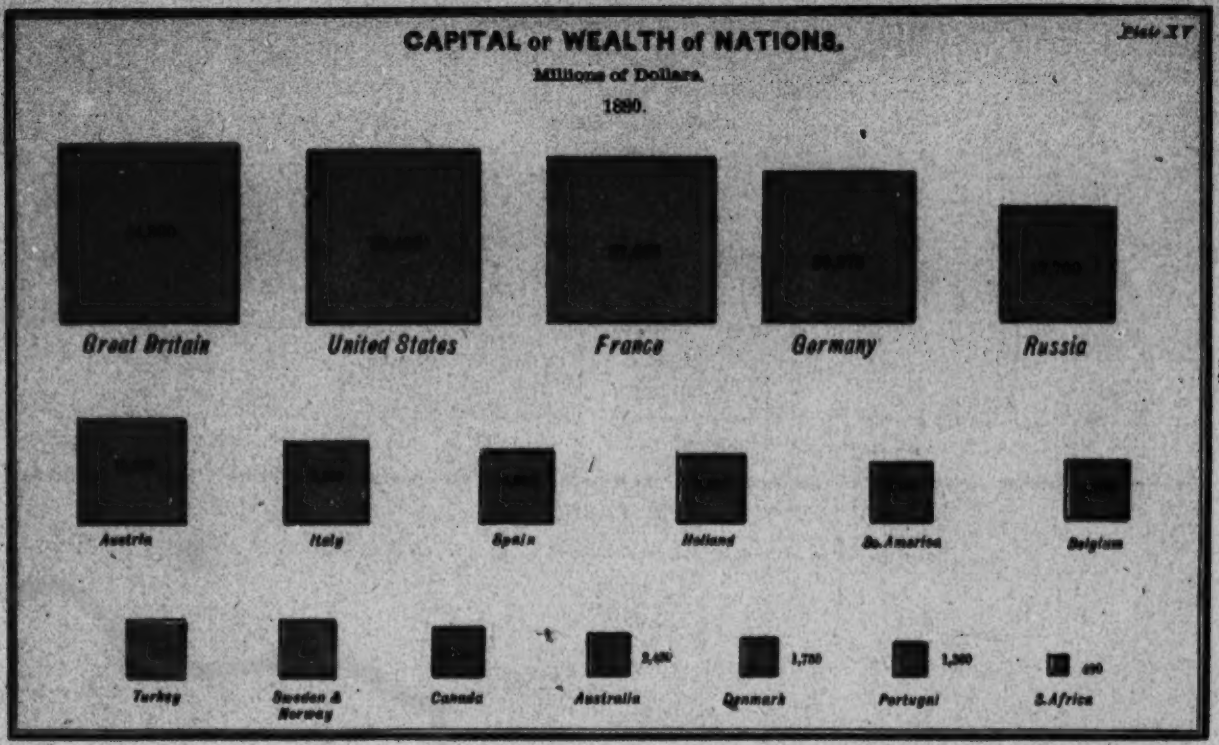

CAPITAL or WEALTH of NATIONS.
Millions of Dollars.
1880.
Great Britain
United States
France
Germany
Russia
Austria
Italy
Spain
Holland
So. America
Belgium
Turkey
Sweden & Norway
Canada
Australia
2,450
Denmark
1,750
Portugal
1,360
S. Africa
400

Plate XV

Plate XVI

ASSESSED VALUE of PROPERTY

Of Five Geographical Divisions of the United States.

Millions of Dollars.

1880.

Plate XVII

STATE DEBT PROPER

Of Five Geographical Divisions as Compared with Value

Millions of Dollars.

1880.

Not long since, when examining the subject of State debts for one of the leading reviews,* I was much struck by the fluctuations of the State debts of the Western States since 1842. The following table presents an exhibit of these debts for the Prairie States at successive periods for forty years. The immense development of resources by immigration, by agriculture, and by manufactures, has increased the resources of these States so that, with purpose constantly maintained, they make for the most part a highly honorable showing.

STATE DEBTS.

States.	1842.	1852.	1860.	1870.	1880.
Ohio	$20,000,000	$15,530,768	.....	$9,732,078	$6,472,640
Indiana	12,751,000	6,712,880	$10,179,267	4,167,507	4,998,178
Illinois	13,527,292	17,500,000	10,277,161	4,890,937	257,459
Michigan	5,611,000	2,307,850	2,316,338	2,385,298	905,149
Iowa	None.	81,795	351,983	584,498	545,435
Wisconsin	None.	12,892	.....	2,253,057	2,253,057
Minnesota	None.	.....	818,636	350,000	2,535,000
Missouri	2,042,261	857,000	25,952,000	17,866,000	16,758,000
Kansas	.....	.....	None.	1,503,306	1,129,175
Nebraska	.....	.....	.....	247,300	599,267
Totals	$59,931,553	$42,993,185	$49,895,325	$44,018,911	$36,443,960

The State debt of Ohio, which was nearly thirteen million in 1841, and upwards of $15,500,000 in 1852, has gradually decreased to $6,472,640. The State of Indiana, bowed down in 1842 with a yoke which it seemed almost impossible to remove, has gradually liquidated its debt, until now it is less than five million dollars. In reality, Indiana's only debt is the foreign debt. The domestic debt consists of different sums which have been donated to the school fund, and amounts for which the State has become indebted to the school fund by using its moneys; and, that this money might inure to the benefit of the school, non-negotiable bonds have been issued by the State to the school fund, which in reality is a debt she owes to herself, and should not be classed or considered as a debt of the State. Deducting the school fund bonds from the total debt, Indiana only owes $1,093,395 to outside parties. Illinois has done even better than Indiana. Its indebtedness reached its maximum in 1852—$17,500,000. It is now virtually out of debt; as the current taxes on the Illinois Central Railroad will pay off its entire liabilities this year.

* "State Debts and Repudiation," by Robert P. Porter: *International Review*, Nov., 1880.

Michigan is practically free from debt, for the reason that there is in the sinking fund more than money enough to pay all of its outstanding bonds, which amount to a trifle over nine hundred thousand dollars. Minnesota has forever disgraced herself by refusing to recognize $2,275,000 of railroad bonds issued in 1858, almost before Minnesota had become a State. There are some efforts now being made to pay this debt.

The State of Kansas has issued bonds twenty-five different times, covering a period from July 1, 1863, to March 15, 1875. The amount of these issues now outstanding is $1,129,175, due from 1883 to 1899. The permanent school fund, sinking fund, State University fund, and so on, holds $713,700 of these bonds, leaving only $415,475 held by individuals. The debt of Missouri, which is larger than that of any other Western State, was mainly incurred in aiding railroads. This does not include the contingent liability of the State in $3,000,000 of bonds loaned to the Hannibal & St. Joe Railroad Company. The debts of Nebraska, Wisconsin, Iowa, and Colorado, are very small, and consist mainly of war and defense bonds and school fund bonds; and, in the case of Nebraska, the bonds were to assist the grasshopper sufferers. The total indebtedness of the Western States at present amounts to $36,565,360; while the assessed valuation of property is over $5,500,000,000.

It is a recent thing that legislatures have arisen to the need of careful guard over the power of collecting and spending the people's money, and the importance of exacting of custodians frequent and full renderings of account to the public.

The State debts of the five sections may be thus stated:

Sections.	1842.	1852.	1860.	1870.	1880.
New England States	$ 7,158,274	$ 6,992,965	$ 7,995,080	$ 50,248,520	$ 49,979,514
Middle States	73,248,072	79,510,726	86,416,045	79,584,481	45,672,576
Southern States	73,346,017	64,499,727	98,046,924	174,486,462	118,997,943
Ten Prairie States	50,981,553	42,998,185	40,995,225	44,018,911	36,565,360
Pacific States	.....	2,159,408	.....	4,178,504	4,547,350
Totals	$212,777,916	$196,085,306	$236,256,364	$352,996,858	$250,732,081

The following table showing the increase in the assessed valuation of real and personal property in the same sections of the country, is instructive in this connection. The tables of 1842 are imperfect; but those of the last four decades may be relied on as official:

Sections.	1842.	1852.	1860.	1870.	1880.
New England States ..	$ 410,000,000	$1,128,194,515	$1,636,495,123	$2,717,582,801	$3,496,112,500
Middle States.....	1,141,300,000	1,593,256,934	2,773,302,939	4,385,795,220	5,316,699,137
Southern States.....	792,000,000	2,459,422,240	4,861,970,635	2,425,910,240	2,226,144,381
Ten Prairie States	232,000,000	879,666,617	2,643,682,940	4,009,265,265	5,532,159,699
Pacific States	.....	56,966,647	158,679,582	307,195,561	685,048,384
Totals	$2,574,940,000	$6,117,531,013	$12,044,081,613	$13,845,099,890	$19,256,084,100

In 1842 the Western States were in debt $59,931,553; the Southern States, $73,340,017; and the Middle States, 73,348,072. In 1852, the first reliable report of the valuation of property, the Southern States exceeded in wealth the Middle States by $896,169,366, and the Western States by $1,609,759,683. To-day the debts of the two latter sections are $45,672,575 and $36,565,360 respectively; while the South, before repudiation, owed $273,205,185, and to-day recognizes $113,967,243 debt. The valuation of property in the Middle States has increased since 1852 from $1,593,256,934 to $5,316,699,137; of the Western States from $879,666,617 to $5,532,159,699; while, in the Southern States, partly owing to the removal of slaves from the personal property column of the auditors' books—which has in no wise impoverished the States—and partly due to a general under-valuation of property, it has decreased from $4,861,970,635 in 1860, to $2,226,144,381 in 1880.

It has been with great difficulty that I have succeeded in obtaining satisfactory statistics in regard to the local taxation for county, school, village, and township purposes. The table herewith presented may be considered as the most reliable one of the kind ever presented; though it is far from being as accurate as I would wish, and will undoubtedly be subjected to some corrections before it becomes official. It will be observed that most of the Western States have no county tax for school purposes. The figures in regard to taxation of cities of over 7,500 inhabitants may be relied upon as correct. Among smaller units, the subject presents many complications that now begin to elicit careful scrutiny. The same population is sometimes taxable by a town levy, a city levy, a school district levy, and even by two school levies. The corporate units into which the people may organize, sometimes aggregate taxes that would be quickly modified if demanded for a single central treasury instead of for a number of separate funds.

LOCAL AND STATE TAXATION.

States.	County.		State.		Cities, etc., under 7,500 pop.	Cities, etc., over 7,500 pop.	School Districts.	Totals.
	General.	School.	General.	School.				
Ohio	$7,084,082	.....	$3,914,349	$1,583,943	$6,079,689*	$7,880,131	..... †	$25,184,145
Indiana	4,582,445	.....	926,297	1,546,297	660,941	1,671,547	$2,074,678	11,746,205
Illinois	4,730,024	.....	1,729,556	1,101,223	7,223,215*	5,318,445	3,634,102	24,376,465
Missouri	2,532,022	.....	1,252,014	564,698	221,713	4,009,506	1,958,140	11,540,255
Michigan	2,452,016	.....	1,155,495	280,410	1,080,497	1,951,689	649,073	7,397,182
Iowa	2,870,981	$409,110	827,253	.....	740,815	1,085,925	3,704,424	10,607,973
Wisconsin	1,722,022	273,957	451,453	.....	660,251	1,567,470	1,388,437	6,017,701
Minnesota	1,951,566	.....	465,736	258,060	206,734	697,199	1,073,827	2,976,475
Kansas	2,080,876	.....	552,189	.....	949,058	236,276	1,120,196	4,519,596
Nebraska	1,327,967	.....	.....	90,589	94,222	205,869	677,206	2,395,473
Totals	$32,306,970	$683,067	$11,386,922	$5,189,559	$18,125,010	$34,908,157	$15,626,308	$107,413,500

The local indebtedness has been obtained with almost absolute accuracy; and the following exhibit, though not official, and still open to possible correction, is extremely interesting as showing the heavy burden of this class of indebtedness which the Western States have to bear, and the great necessity of constantly watching the minor civil divisions of the country, lest, in unguarded moments, those intrusted with the management of local affairs contract debt, in the name of public improvements, far in advance of the increase and actual necessities of the population or its ability to pay:

LOCAL INDEBTEDNESS.

States.	County.		Cities, Towns, etc., of less than 7,500 pop.		Cities, etc., of more than 7,500 population.		School Districts.	Totals.
	Bonded.	Floating	Bonded.	Floating	Bonded.	Floating.		
Ohio	$ 2,927,870	.....	$3,084,101	.....	$40,823,226	$ 807,228‡	$1,459,197	$47,984,976
Indiana	2,986,507	$1,187,507	1,565,949	$ 98,300	6,956,700	315 949	195,440	14,111,977
Illinois	13,582,736	288,566	2,948,758	180,498	18,560,980	160,189	3,406,204	39,117,774
Missouri	11,949,498	274,910	1,421,059	306,894	26,148,449	1,468,418	719,704	43,110,977
Michigan	910,309	26,399	1,850,651	50,699	5,548,045	2,300	305,726	8,693,911
Iowa	2,660,467	203,106	1,040,309	101,379	3,061,956	165,000	1,125,128	8,516,611
Wisconsin	2,080,169	212,095	895,989	38,878	3,658,651	6,725	278,548	7,170,870
Minnesota	747,777	104,005	748,457	28,250	2,921,911	12,804	788,445	5,352,739
Kansas	7,286,686	566,166	849,609	44,925	1,529,815	5,900	1,761,209	12,492,046
Nebraska	4,417,080	611,759	206,765	40,143	488,589	49,050§	1,900,587	6,923,869
Totals	$ 49,472,114	$3,873,906	$ 13,712,575	$749,849	$ 109,981,999	$ 3,003,727	$ 11,782,043	$ 199,980,482

The purposes for which the most of this debt has been incurred, the rates of interest it bears, and the dates of its issue and maturity, will be found in chapters on the various States.

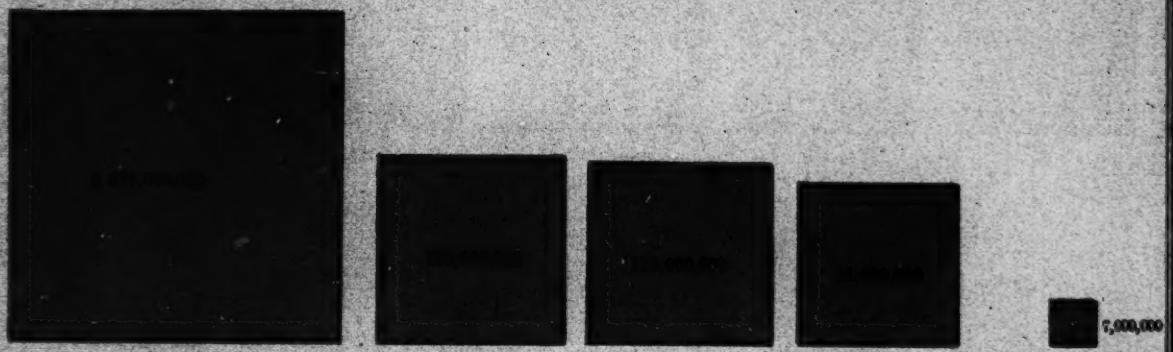
* This sum includes $1,206,181, known as Registered Bond Tax.
† This includes school district tax. ‡ All bonded. § From Auditor's report.

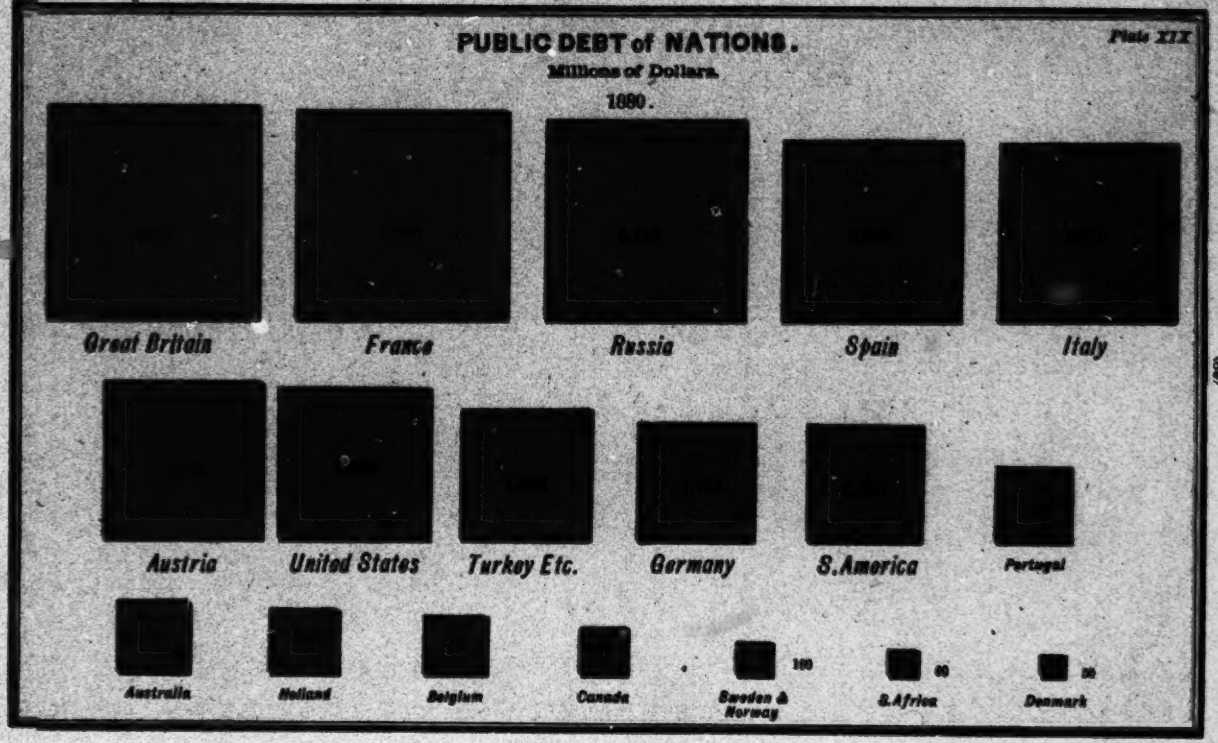
Plate XVIII

INDEBTEDNESS of CITIES

Of Five Geographical Divisions of the United States.

1880.




PUBLIC DEBT of NATIONS.
Millions of Dollars.
1890.
Plate XIX
Great Britain
France
Russia
Spain
Italy
Austria
United States
Turkey Etc.
Germany
S.America
Portugal
Australia
Holland
Belgium
Canada
Sweden & Norway
100
S.Africa
60
Denmark
30

A glance at the following will show the distribution of city indebtedness in the five geographical sections of the country:

States.	Bonded Debt.	Floating Debt.	Gross Debt.	Sinking Fund.	Net Debt.
New England States	$113,261,373	$ 6,885,164	$120,459,727	$21,275,514	$ 99,181,209
Middle States	308,861,335	12,156,181	305,017,516	81,319,939	217,699,574
Southern States	64,052,648	6,501,259	70,554,227	5,971,796	64,582,431
Prairie States	110,961,289	2,006,727	112,968,016	7,091,259	105,876,757
Pacific States and Utah	7,920,415	344,908	7,504,416	1,831,715	5,672,701
Totals	$605,006,060	$28,489,484	$716,585,904	$117,191,503	$593,344,418

Taking the net debt column, after having carefully deducted the sinking fund, I find, that, of the $593,000,000 of net debt of cities, $105,000,000, or about eighteen per cent. of it, is located in the ten Western States. Briefly to summarize the relative condition, I find that the New England States, with a population of little over four millions, and an assessed valuation of two billions and a half, have a net local debt of upwards of ninety-nine millions of dollars; that the Middle States, with a population of about eleven millions and a half, and a valuation of five billion three hundred and sixteen million dollars, have a net municipal debt of upwards of three hundred and seventeen million dollars; the Southern States, with a population of fifteen and a quarter millions, and a valuation of two billions two hundred and twenty-six million dollars, have a net municipal debt of nearly sixty-five million dollars; the Prairie States, with a population of about seventeen million two hundred and thirty thousand, and an assessed valuation of over five billions and a half, have a net debt of a little over one hundred and five millions of dollars. The city debts of the Pacific States and Territories, are, as yet, very small; and it is to be hoped that they will never be materially increased.

The total amount of the public debt of the United States other than the National debt (without deducting the sinking fund) is $1,187,536,598. Of this amount, $250,722,081, or over twenty-one per cent., is State debt; $125,601,258, or ten and a half per cent., county debt; $27,423,084, or about two and three-tenths per cent., township debt; $18,844,415, or about one and six-tenths per cent., school district debt; $710,535,924, or about sixty per cent., large-city debt; and $55,009,836, or four and six-tenths per cent., small-city and village debt. During the last ten years the aggregate

of this debt has increased about thirty-seven per cent.: State debts have, however, decreased thirty-seven per cent., and county debts nearly nine per cent. The municipal debt of the country has increased over 133 per cent. in this period. The percentage of State, county, municipal debt, and of wealth (according to assessor's returns), for each section of the country, is given below:

States.	Per Cent. of State Debt.	Per Cent. of County Debt.	Per Cent. of City Debt.	Per Cent. of Wealth.
New England	19.93	2.25	16.71	15.37
Middle	18.21	24.70	53.54	32.70
Southern	45.45	19.36	10.95	13.63
Prairie	14.58	42.69	17.84	34.02
Pacific	1.83	11.10	.96	4.28
Totals	100.00	100.00	100.00	100.00

This is a very favorable showing for the Prairie States. With thirty-four per cent. of the total wealth of the country, they have only fourteen and a half per cent. of the State debt, and less than eighteen per cent. of the municipal debt. The county debt of the entire country is only about $125,000,000; and of this the Prairie States have nearly forty-three per cent.

On the 20th of May, 1785, Congress, legislating for the government of the public domain, made this provision for education: "There shall be reserved the Lot No. 16 of every township for the maintenance of public schools." In the grand Ordinance of 1787, occurs this declaration: "Religion, morality, and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall be forever encouraged." This was the key-note to the regard for education and for morality in the development of the new States. In 1787, two townships of land were set apart "for the purpose of a university" in each new State. In accordance with these provisions, every State admitted since 1800 has had at least two townships for higher education. Ohio had three; one while a Territory, and two as a State. Wisconsin reserved four. In 1836, the $28,000,000 surplus in the United States Treasury was loaned to the existing States, forming in many of them a permanent educational fund. In 1841, Congress granted half a million acres of land for internal improvements

to each of certain States,* of which some used theirs wholly for school funds; and in some other States some portion of the grant swelled the school fund. Since 1848, two sections in every township, the sixteenth and the thirty-sixth, have been given to each incoming State and Territory for schools. In laws of 1849, 1850, 1860, the "Swamp lands" in certain† States were given to them, and a percentage of their value was devoted to education. Some provisions, meantime, gave a portion of the avails of the general sales of the land to certain States. In 1862, Congress granted lands to each State in proportion to its representation (30,000 acres for each senator and representative), to establish colleges for the encouragement, among other things, of industrial and mechanical instruction. These are what are now known as the "land grant," or "State agricultural colleges." In the West these successive acts, evincing the national appreciation of education and religion, have been heartily responded to by the States themselves.

The pioneers whose camp fires, from Massachusetts' Harbor westward, have marked the advance line in the conquests of industry, have been for the most part God-fearing men, who, opposed to the supremacy of the church, still recognized it as a necessary factor in the upbuilding of a successful commonwealth, and provided generously for its growth and conservation. Thus it has happened, that, upon the borders of unconquered wilds, amid the rude surroundings of pioneer life, among the first communal acts of a new settlement, as a rule, prior even to its civil organization, steps were taken for the establishment of public worship. Often, as in the early history of the New England towns, the minister discharged the additional function of the teacher, and instructed those who were permitted to pursue their studies beyond the rudimentary knowledge imparted by the brave women who found opportunity, in the midst of their many cares, to teach their children how to read and write, how to think, and how to live. In any new community the national idea included the school as a matter of course; and the first rude public building served both for church and school house.

* Fifteen—Alabama, Arkansas, California, Florida, Illinois, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, Oregon, and Wisconsin—have received land under provisions of the act of 1841. California, Iowa, Kansas, Nevada, Oregon, and Wisconsin appropriated this grant to educational purposes.

† Fourteen—Alabama, Arkansas, California, Florida, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Oregon, and Wisconsin.

The spirit which inspired these provisions for the moral and the intellectual training of the young, was but the projection of that which was already filling the Eastern States with intelligence and thrift. As of the Atlantic States, so of the West, it may be said, that, whatever the prosperity due to other causes, a large measure of it is due to the church and the school as the nurseries of a true and brave manhood and womanhood.

As the original territory of the Northwest, through various transitions, developed into prosperous States with well-ordered civil divisions, in each of them provisions, more or less ample, were made for public instruction. A patent moral influence emanates from the pulpit and the Sunday-school. Often failing in the West, as elsewhere, as has been justly said, "to exalt the pure ideal of the Gospel above the temporizing expediencies of gain," the church, through its various agencies, still sways a grand power among the educational factors of the day.

The homes of our country are its great hope. In the conservation of the home as a centre of moral influence, lies the safety of the state. The public life of the West, which is but the larger side of its home life, notwithstanding the comparatively recent transition from the rude conditions characteristic of new communities, is as exalted and pure as in the States of the East.

In the organization of their public school systems, the newer States, profiting by the experience of the older, have been able, with almost phenomenal quickness, to place the work of public instruction upon a footing only secured at the East after long years of experiment and laborious effort.

With few exceptions, nowhere in the country are provisions for the education of youth of all classes in all respects so complete and satisfactory. A comparison of school laws shows a remarkable degree of uniformity in the ends sought, and in the provision for their attainment, and a like degree of uniformity is observable as to results. The average expenditure for each inhabitant of the leading States of the West, as shown by the accompanying tables, is almost double the expenditure per inhabitant in the Middle States, and nearly five times that of the Southern States; while the proportion of children in attendance is higher than in any other part of the Union.

The percentage of public school attendance to population in different parts of the Union is as follows:

States.	Per Cent of Population.	Cost per Capita of Popular'n.	States and Territories.	Per Cent of Population.	Cost per Capita of Popular'n.
New England.....	19.22	$2.26	Western.....	22.66	$2.05
Middle.....	20.30	1.04	Pacific.....	14.61	2.82
Southern.....	13.61	.46			

The public spirit which shows itself in the progress made in public school instruction, is also seen in the attention which has been paid to private schools and colleges, established and maintained by individual and denominational effort.

The accompanying table, which is compiled from the Census reports of 1850, 1860, and 1870, from the reports of the Commissioner of Education, and the reports of State officers of Public Instruction, presents a retrospective view of the progress of popular education in the States named:

States.	Census Years.	Whole No. of Schools.	No. of Academies.	No. of Colleges.	No. of Prof. Schools.	Total Cost of Schools.	Average Wages per Month of F. S. Teachers.
Ohio.....	1870	11,958	138	26	22	$6,614,816.89	42.25
	1880	16,364	207	39	27	7,711,825.24	41.60
Indiana.....	1850	4,264					
	1860	6,841	68	7			
	1870	9,073	118	12	4	2,429,811.00	47.00
	1880	12,706	205	16	6	4,491,250.00	45.50
Illinois.....	1850	4,141					
	1860	8,718	211	6			
	1870	11,825	438	22	12	5,970,259.00	39.75
	1880	20,697	575	30	20	6,981,941.79	36.10
Michigan.....	1850	2,754				208,782.00	
	1860	4,101	94	6		516,695.00	
	1870	5,505	93	8	3	2,726,693.94	39.15
	1880	8,900	264	10	6	2,788,197.97	35.50
Wisconsin.....	1850	1,493					
	1860	3,987					
	1870	5,243	62	3	4	2,050,210.00	38.50
	1880	8,569	110	7	6	2,606,286.00	30.70
Minnesota.....	1850	1				140.00	
	1860	913	4			116,808.00	
	1870	2,479	15	4		1,011,789.00	37.50
	1880	3,707	42	6	2	1,366,488.90	39.70
Iowa.....	1850	775					
	1860	3,916	17	9			
	1870	7,486	34	12	6	3,070,802.00	36.50
	1880	11,867	110	21	6	3,980,396.00	39.70
Missouri.....	1850	1,783	14	2			
	1860	4,396	34	6			
	1870	6,750	145	9	10	2,340,869.00	39.75
	1880	11,019	201	17	15	3,119,179.00	36.40
Kansas.....	1860	154	20	3		80,782.00	
	1870	1,689	34	5		797,269.00	39.50
	1880	7,880	46	6	2	1,819,286.00	39.75
Nebraska.....	1860	27					
	1870	708	3	1		272,263.00	47.25
	1880	2,952	26	3		1,353,997.00	39.65

The school population of the ten Prairie States was: Ohio, 1,043,320; Wisconsin, 483,453; Indiana, 708,101; Minnesota, 271,428 in 1878; Illinois, 1,000,694; Missouri, 702,152; Michigan, 486,993; Kansas, 312,231; Iowa, 577,353; Nebraska, 122,411; total, 5,708,136, as against 14,962,336 for the whole United States.

Scarcely second in point of time, among the educational influences which have contributed to make the fortunes of the West, is the newspaper. Accommodating itself quickly to the conditions of new communities, the printing press established itself in embryo towns, whose houses were yet without foundations. Thus upon the lines of commerce, along which the food products of the West are borne eastward, and in the midst of the mines yielding gold and silver and the baser metals, not only in answer to a commercial necessity, but in response to the demands of an intelligent people eager for knowledge, newspapers at once became among the most important and far reaching of educational influences. As indicated by the following tables, compiled expressly for this volume by the eminent statistician Mr. S. N. D. North, of New York, more than one-third of the established dailies, and about one-fourth of the aggregate circulation of the daily press of the United States, are in the nine great States of the West. The table shows the number, average subscription price, and aggregate circulation:

States.	No.	No. German.	Average Subscription Price.	Aggregate Circulation.	Annual Aggregate Circulation.
Ohio	54	10	$7.00	207,284	65,890,389
Indiana	40	4	6.70	71,143	21,404,510
Illinois	73	9	6.86	268,333	84,484,788
Michigan	33	2	5.73	63,949	20,417,333
Wisconsin	21	3	8.33	24,300	9,611,250
Iowa	32	3	8.33	34,860	11,134,935
Kansas	19	1	7.10	23,051	7,029,412
Missouri	43	7	7.82	141,700	37,791,460
Nebraska	14	.....	8.10	14,148	4,639,780
Totals	328	39	6.57	888,718	262,423,736
Totals for country	962	81	7.33	3,581,187	1,127,337,333

The following tables show the number of letters mailed in each State and Territory in 1880, its rank in this regard; and the average number of letters mailed for each inhabitant:

Western States and Territories.

States and Territories.	Rank.	No. of Letters Mailed 1880.	Average per Inhabitant.
Arizona	44	1,273,420	31.61
Arkansas	34	6,419,296	7.99
California	12	22,562,268	26.09
Colorado	25	10,749,024	55.29
Dakota	36	4,023,706	29.76
Idaho	47	825,812	25.33
Illinois	4	68,643,338	29.29
Indiana	9	25,574,536	12.97
Indian Territory	48	465,452	6.05
Iowa	8	38,984,592	17.84
Kansas	15	18,380,908	18.45
Michigan	7	32,928,696	20.13
Minnesota	17	16,742,440	21.44
Missouri	6	39,702,208	18.30
Montana	43	1,576,234	40.25
Nebraska	26	10,291,320	23.74
Nevada	41	1,968,884	31.54
New Mexico	42	1,584,700	18.33
Ohio	5	61,464,052	19.21
Oregon	37	3,636,880	20.80
Utah	39	2,796,040	19.42
Washington Territory	45	1,141,452	15.19
Wisconsin	11	22,765,912	17.30
Wyoming	46	880,568	42.35

Eastern States.

Maine	23	13,215,696	20.36
New Hampshire	29	7,698,548	22.18
Vermont	33	7,058,688	21.24
Rhode Island	32	7,174,960	25.94
Massachusetts	3	69,010,604	38.70
Connecticut	10	23,568,268	58.20

Middle States.

New York	1	211,435,640	41.58
Pennsylvania	2	105,287,340	24.57
New Jersey	13	20,788,048	18.37
Delaware	40	2,384,928	16.26

Southern States.

Maryland	18	16,475,732	17.63
Virginia	16	16,874,104	11.15
West Virginia	35	4,912,492	7.94
North Carolina	28	8,137,012	5.81
South Carolina	31	7,205,276	7.23
Georgia	20	14,607,216	9.49
Florida	38	3,071,276	11.48
Alabama	27	8,891,376	7.04
Mississippi	30	7,265,544	6.42
Louisiana	22	18,782,184	14.66
Texas	14	18,738,016	11.75
Tennessee	24	11,262,784	7.30

District of Columbia	19	15,154,620	85.31
Alaska	49	6,812	.22

It is not surprising, that, in regions so distinguished by the evidences of energy, intelligence, and prosperity, the foregoing statistics should show, that, in the use of the mails—a fair gauge by which to estimate the difference of intelligence among the masses—the Western States should compare more than favorably with those of the East and South.

The following statistics of important public libraries, are from a compilation made by Mr. A. R. Spofford, the courteous librarian of the Congressional Library:

States.	No. of Libraries.	No. of Vols. Contained Therein.	States.	No. of Libraries.	No. of Vols. Contained Therein.
Ohio	223	614,279	Missouri	87	262,353
Indiana	133	240,769	Nebraska	14	26,760
Illinois	177	466,378	Kansas	19	40,864
Michigan	89	211,815			
Wisconsin	73	184,714	Totals	933	2,251,021
Minnesota	39	73,830			
Iowa	79	130,260			

The American who leaves the East for the West will find its religious and its educational advantages but the natural growth of the seed grown on the Atlantic shores; and the emigrant who comes from highly organized Germany, Sweden, or the later awakened Britain, will find Western laws empowering him to reproduce all that he desires of the educational systems he prized; while the broadest religious toleration leaves all to combine their efforts as they will without the burdens and the penalties that rest on dissenters beyond the Atlantic.

Looking back forty years, we find the then existing Prairie States containing a meagre population, mostly dwellers in log houses, without any large centres of commercial activity, without their vast net-work of railroads, without their canals and the present sound banking system, vainly struggling to infuse life into banks that had little but paper for assets, to build railroads without the money to pay the tariff on the iron, to dig canals without being able to hire the laborers, and to construct other internal improvements, without credit to borrow the first installment necessary to start the work. At this time, for example, Illinois was struggling with projects which, including State banks, involved capital of over twenty-three and a half million dollars; and yet there were then but seventy thousand log cabin farmers in the State, and these loans equaled

about three hundred dollars for each family. Indiana had started vast schemes for railroads and canals, and commenced operations, on the whole, simultaneously. The result was, that vast sums of money were expended before any work was complete, and the State for years verged on bankruptcy. Michigan had the misfortune to enter the Union in times of great speculative excitement. This extraordinary fever had culminated in a bank mania in Michigan; and, though the population of that State was but 31,369 in 1831, in 1833 it had twenty banks, and at the close of 1837, forty banks, with aggregate loans of nearly four million dollars. A reckless spirit of speculation universally prevailed throughout these States. All seemed to be deluded by deceitful visions of imaginary wealth. Industry and economy were disregarded, and recourse was had to extensive credits, and the pernicious system of borrowing. No sooner was Michigan admitted to the Union than the legislature appointed a Board of Commissioners of Internal Improvements, and authorized, March 1, 1837, the survey and construction of 557 miles of railroads, 231 miles of canals, and the improvement of 321 miles of river navigation. A loan of five million dollars was authorized for these objects. Fortunately for Wisconsin, the constitution of the State forbade the creation of a State debt to an amount greater than $100,000. But even the constitutional authority was evaded, and the legislature, by a series of acts, conferred upon counties, towns, cities, and villages, the power of contracting debts. In the early history of the State these powers had been used to a considerable extent, and in 1858 over eleven and a half millions of dollars had gone in this way. The State of Missouri had embarked in the perilous course of lending her credit to corporate companies, but was not seriously embarrassed during this period. Ohio had carried on an extensive system of improvements; but, partly owing to her early settlement, and partly owing to the fact that in the year 1825 she established a co-ordinate and co-extensive system of taxation, she suffered less than some other States; and, while the abandonment of some of the works was seriously talked of in 1841 and 1842, the State managed to meet her obligations without any serious embarrassment. Iowa, Kansas, Nebraska, and Minnesota were States that came into existence at a later day and under different environments, and with the lessons of the danger in pushing

public improvements of all kinds far in advance of population, as shown in the case of their sister States, by which to profit.

Turn from this picture to the one presented by the array of facts and figures in this chapter, or to the more detailed sketches that will follow, and study the Prairie States of to-day, with their State debts mainly paid, their broad acres bringing forth abundant harvests, their workshops competing with the Eastern States, their net-work of railroads, and their great cities and vast commercial relations with the civilized world. The growth of these States should be studied, in all their lights and shades, in the characters of the old pioneers—

> Who crossed the prairies, as of old
> Their fathers crossed the sea,
> To make the West, as they the East,
> The homestead of the free;

in their early constitutions and institutions; by the success and the failure of their enterprises, as they cut through the forests and plowed the vast prairies, built railroads or dug canals, inaugurated commercial ventures or opened up mines of precious metal. The long lines of moving wagons, and the dangers that beset the early immigrants, should not be passed over in the rush of frequent trains traversing these regions at lightning speed; for here we have a lesson of the endurance and courage necessary to open up a wilderness and make it blossom with a harvest. The hardships of log-cabin days and of dangerous encampments, are now giving way to the comfort of homes, and the luxuries that the railroad brings to the door. As years pass, the shades of this early life will disappear with the brightness of handsomely built cities, while the gloomy financial embarrassments that rested on the struggling communities of 1840 will be traceable in the history of some of our most valuable public works. A more perfect study of these phases of early life in the Prairie States will incline us to look charitably, not only upon the defects of the generation now silently stealing into the gloom of the grave, but upon the inheritors of their toil, who, as years pass, will tone the predominant idea of material progress, and give more attention to the still higher aims of life, and be better prepared for the new condition of civilization that awaits them.

CHAPTER II.

THE TERRITORIES.

In the previous chapter I have briefly described the entire area of country I propose to discuss in this volume; and hence it will not be necessary to retrace our footsteps, the chapter on each State and Territory amply supplying all details. The area of the ten Western States has been shown to be 616,755 square miles, or 394,723,200 acres; the area of the Territories comprising Arizona, Dakota, Idaho, Indian Territory, Montana, New Mexico, Utah, Washington, Wyoming, and the unorganized territory aggregates 938,050 square miles, or 600,352,000 acres, or very nearly one-third of the entire country, as the following table shows:

Territories.	Area, square miles.	Area, acres.
Arizona	113,020	72,332,800
Dakota	149,100	95,424,000
Idaho	84,800	54,272,000
Indian Territory	64,690	41,401,600
Montana	146,080	93,491,200
New Mexico	122,580	78,451,200
Utah	84,970	54,380,800
Washington	69,180	44,275,200
Wyoming	97,890	62,649,600
Unorganized territory	5,740	3,673,600
Totals	938,050	600,352,000
Totals for United States	3,025,600	1,936,384,000

The Indian Territory and unorganized territory are only included in the Territories proper for the purpose of showing the area of the different geographical sections of the United States, and do not form a part of the territory included in the West as defined for our present purpose. The population of

this region is indeed meagre, and, as will be seen by the following population table, does not reach the density of one to the square mile:

POPULATION.

Territories.	1880.	1870.	1860.	1850.
Arizona	40,441	9,658	.....	.....
Dakota	135,180	14,181	4,837	.....
Idaho	32,611	14,999	.....	.....
Montana	39,157	20,595	.....	.....
New Mexico	118,430	91,874	93,516	61,547
Utah	143,906	86,786	40,273	11,380
Washington	75,120	23,955	11,594	.....
Wyoming	20,788	9,118	.....	.....
Totals	605,633	271,166	150,220	72,927

The Census of 1880 shows, as might be expected from the character of the country, that the male is largely in excess of the female population, but few women having as yet ventured into these wild and uncultivated regions:

MALES IN EXCESS.

Territories.	Per cent of excess.	Territories.	Per cent. of excess.
Arizona	130	New Mexico	16.5
Dakota	55	Utah	7.2
Idaho	102	Washington	57.5
Montana	156	Wyoming	113.0

A large proportion of the population is made up of adventurous foreigners from all quarters of the globe, as the table of foreign and native born indicates:

Territories.	Per cent. of foreign pop.	Territories.	Per cent. of foreign pop.
Arizona	65	New Mexico	9
Dakota	63	Utah	43
Idaho	44	Washington	26
Montana	41	Wyoming	39

The people are mostly interested in mining and stock raising; though cereal crops will undoubtedly, in the course of time, assume vast proportions in Dakota, Montana, Idaho, Utah, New Mexico, and Washington. As yet, however, but a small proportion of the land cultivated in cereals can be assigned to

this section of the United States. The following are the present areas cultivated in cereals:

ACRES IN CEREALS.

Territories.	Corn.	Wheat.	Oats.	Barley.	Rye.	Buckwheat
Arizona	1,818	9,026	29	12,404	.....	.....
Dakota	90,853	265,298	78,226	16,156	2,685	321
Idaho	569	22,066	13,197	8,291	354	.....
Montana	197	17,665	34,691	1,333	15	34
New Mexico	41,449	51,230	9,287	2,548	17	.....
Utah	12,007	72,542	19,535	11,368	1,153	.....
Washington	2,117	81,554	37,962	14,690	518	106
Wyoming	.....	241	822	.....	6	.....
Totals	149,009	519,623	193,689	66,670	4,448	461
Totals U.S.	62,368,869	35,430,053	16,144,593	1,997,717	1,842,308	848,289

The production of cereal crops and the progress made may best be realized by the following table, showing the total cereal production of each Territory for the past three decades, and the percentage of increase or decrease:

Territories.	Total Cereal Product, in Bushels.				
	1860.	1870.	Per cent. of increase.	1880.	Per cent. of increase.
Dakota	24,569	422,426	1,619.34	7,352,589	1,640.56
Montana	.....	418,756	.....	1,417,089	238.40
Wyoming	.....	100	.....	27,264	27,264.00
Idaho	.....	255,591	.....	1,296,324	407.98
Utah	549,383	770,297	40.29	1,977,368	156.70
New Mexico	1,158,264	1,065,233	*8.73	1,547,247	45.25
Arizona	.....	114,195	.....	410,788	259.85
Washington	230,737	554,549	140.33	4,108,370	641.02
Totals	1,962,953	3,601,187	83.46	18,139,089	403.70

It appears, therefore, that the cereal crops of these Territories have grown from less than 2,000,000 bushels in 1860 to over 18,000,000 bushels in 1880, an increase of over ninefold in twenty years; of which by far the largest aggregates were in Dakota and Washington—which from producing less than one-fourth of the total cereal crops of the Territories in 1870, advanced to the production of nearly two-thirds of the whole in 1880. In wheat and corn the following progress has been made:

* Decrease.

Territories.	Wheat.				
	1860.	1870.	Per cent. of increase.	1880.	Per cent. of increase.
Dakota	945	170,662	17,969.47	2,830,289	1,558.36
Montana	.....	181,184	.....	469,688	159.23
Wyoming	.....	.....	.....	4,674	.....
Idaho	.....	75,650	.....	540,589	614.55
Utah	384,892	558,473	45.10	1,169,199	109.34
New Mexico	434,309	352,822	*18.76	706,641	100.28
Arizona	.....	27,052	.....	136,427	404.31
Washington	86,219	217,043	151.78	1,921,322	785.23
Totals	906,365	1,582,886	74.62	7,778,829	384.84

Territories.	Corn.				
	1860.	1870.	Per cent. of increase.	1880.	Per cent. of increase.
Dakota	20,269	133,140	556.87	2,000,864	1,402.08
Montana	.....	330	.....	5,649	1,665.31
Wyoming	.....	.....	.....	.....	.....
Idaho	.....	5,750	.....	16,408	185.37
Utah	90,482	95,557	5.60	163,343	70.91
New Mexico	709,304	640,823	*9.65	633,786	*1.09
Arizona	.....	32,041	.....	34,746	8.44
Washington	4,712	21,781	362.24	39,183	79.89
Totals	824,767	929,412	12.68	2,893,978	211.37

These statistics show that, since 1860, the aggregate wheat production of the Territories has increased from less than a million bushels to nearly eight million bushels.

The following is a rough estimate of the cattle, sheep, and swine of this region:†

Territories.	Cattle.	Sheep.	Swine.
Dakota	200,000	50,000	75,000
Montana	489,500	512,600	29,000
Wyoming	575,000	350,000	4,000
Idaho	209,000	62,900	16,300
Utah	175,000	495,000	40,000
New Mexico	400,000	5,000,000	10,000
Arizona	145,000	1,326,000	9,700
Washington	205,745	340,095	48,074
Totals	2,399,245	8,136,595	232,074

* Decrease.

† For the live stock statistics of the Census Bureau, which were not obtainable until after this volume had been electrotyped and the first chapter had gone to press, see the Appendix.

The advantages and the disadvantages of the various sections of the above Territory in respect to cattle and sheep raising are all set forth in subsequent chapters, and need no recapitulation. The amount of precious metals produced in the Territories, according to Wells, Fargo & Co., for 1880, was as follows:

Territories.	Gold dust and bullion, by express.	Gold dust and bullion, by other conveyances.	Silver bullion by express.	Ores and base bullion, by freight.	Totals.
Dakota	$3,749,081	$374,000	.....	.....	$4,123,081
Montana	1,115,787	55,789	$ 919,189	$1,731,614	3,822,379
Idaho	1,175,115	235,033	332,755	151,854	1,894,747
Utah	95,958	10,336	3,076,775	3,267,884	6,450,953
New Mexico	27,300	.....	684,000	.....	711,300
Arizona	159,970	80,000	2,880,449	1,402,052	4,472,471
Washington	68,911	34,500	1,753	.....	105,164
Totals	$6,392,123	$789,648	$7,844,921	$6,553,404	$21,580,095

Thus upward of $21,000,000 of precious metals are annually produced in these Territories, nearly twenty-five per cent. of the entire product of the United States. Mining laws in the country west of Missouri are based upon the theory that all mineral deposits except coal are in form of the ideal fissure vein, *i. e.*, a body of ore having a certain definite thickness, dipping at a steep angle, and holding its course downward. Upon this assumption, the discoverer is entitled, by the present laws, to a certain distance upon the vein, say 1,500 feet, with a width of 150 to 300 feet on each side of the outcrop. The owner is at liberty to follow the deposit underground wherever it may lead, outside of his side lines. Were all mineral deposits of this type, the law might, in most cases, be a good one. But the ideal fissure vein exists only in imagination. Mineral deposits occur in all sorts of forms—beds, contact veins, masses of miscellaneous shapes, segregations, "blow-outs," in short, everything but "true fissure veins;" and the law does not cover them. In many cases the line of outcrop can not be determined, and side and end lines have to be placed at random. It can be easily seen that such a law affords infinite opportunity for litigation; so that it is a common saying that a mining title is merely a title to a law suit, with a possibility of a mine thrown in. Verily, possession here is nine points, and a shot-gun title holds better than anything else. The whole trouble arises in an attempt to convey the mineral deposit separate from the land, a plan which

seems scarcely feasible. It would appear to be much better and simpler to convey simply the land, with whatever mineral may be within its limits.

As railroads are pushed into this region, and the facilities for the transportation of crops, cattle, and the products of the mines, improve, it may be safe to predict a still more rapid progress. At present the Territories have the following railroad mileage:

Territories.	Miles of railroad in 1880.	Territories.	Miles of railroad in 1880.
Dakota	1,265	New Mexico	643
Montana	48	Arizona	384
Wyoming	472	Washington	274
Idaho	220		
Utah	770	Total	4,076

It is well known, that, in that part of our country which may be roughly defined as lying west of the 100th meridian, which includes nearly all of the Territories, irrigation is almost universally necessary to secure success in agriculture, owing to the slight rainfall and the dry atmosphere. Over much of this region, the air is so dry that there is little or no dew, although the temperature often falls forty, fifty, or more degrees, between midday and midnight. The annual rainfall ranges from twenty-five down to four inches. It is greatest on the eastern border of this region, and thence decreases westward and southward, reaching its minimum in Southwestern Arizona and Southern California. From this arid region must be excepted that lying west of the Sierra Nevada and Cascade Range, in California, and Western Oregon and Washington. Here peculiar climatic influences are at work, which, with their results, will be noticed farther on. Other exceptions from the general aridity must be made, in the case of small valleys, etc., in the immediate neighborhood of high mountains. These are, in many cases, well watered, owing to their proximity to the mountains; but they are small and of little importance in a general discussion of the subject. The eastern limit of this region consists of a broad belt of debatable land, which in one season may be tolerably well watered, and is susceptible of cultivation without irrigation, while in the next season everything not artificially watered may be dried up. This is Powell's sub-humid region.

This belt, having a breadth of several degrees of longitude, occupies the coteaus of Dakota, mainly east of the middle line of that Territory, the middle portion of Nebraska, lies somewhat west of the middle of Kansas, occupies the western part of Indian Territory, and the central portion of Texas, comprising the lower course of the Rio Grande, even to its mouth.

Here is an area of 1,400,000 square miles, or nearly one-half the area of the United States, (exclusive of Alaska), where one of the most important industries, agriculture, is entirely dependent upon irrigation. Without water, the land is of value only to the cattle raiser: with it, it becomes as valuable as the rich prairies of the Mississippi valley. The subject of irrigation, then, is one of the utmost importance, not only to the States and Territories of this section, but to the country at large, as the productiveness of nearly one-half of the country depends upon it.

Throughout most of this region the quantity of arable land is dependent upon the amount of water at hand. Of the great extent of the plains, covering hundreds of thousands of square miles, stretching from the Missouri to the base of the Rocky Mountains, and the Saskatchewan to the Mexican border, there is sufficient water to irrigate barely a tithe. Of the great mountain valleys of Montana, Wyoming, Colorado, and New Mexico, but a comparatively small portion can ever be brought under the dominion of the farmer, from want of water. Of the great desert expanses of Western Utah, Nevada, Arizona, Southern and Eastern California, but very little can ever be redeemed, for the same reason. There are few streams in the whole West which can not be used up to the full amount of their annual discharge, and yet there will be vast areas of the richest land doomed to remain forever a desert, unless a change of climate should afford the needed relief.

It becomes a question, not of land, but of water. The values of the two are reversed. The water here becomes the valuable commodity; as without it, the land can not be given away—at least, so long as our paternal government continues to furnish pasturage for nothing. The utmost economy in the use of this precious commodity becomes, then, the great desideratum. A "cubic foot of water" saved means the redemption of 200 acres of the best of land from the desert. It means an additional production of 4,000 to 6,000 bushels of wheat, having a cash

value of $3,000 to $5,000. It is, however, a fact, strange as it may seem, that, throughout the arid region, excepting Southern California, the most wasteful system, or want of system, prevails. In Colorado, there is used four or five times as much water as is needed. In Utah, at least twice as much; while, in the Great Valley of California, irrigators are fully as wasteful of the precious fluid as in Colorado.

Throughout the West, water is generally measured by what is known as the "miner's inch;" *i. e.*, the quantity which will flow through an aperture one square inch in area, under a given pressure, or head. As commonly measured, about forty miner's inches are approximately equal to a flowage of one cubic foot per second. The latter mode of measurement is a much more definite and satisfactory one, and is gradually being adopted.

The "duty" of water is the area of land which a certain quantity—one cubic foot per second, for example—will suffice to water. Were all land uniform in slope, all soils the same in respect to porosity, did all crops require the same amount of moisture, and were the atmosphere everywhere of the same degree of aridity, then the duty of water would everywhere be the same. But these conditions vary through a very wide range in different parts of the country, and with different crops; and no rule can be laid down except for the great average of crops, soils, etc. Clay lands require less than sandy soils, for very obvious reasons. Level land takes more than rolling or sloping land, as the water remains on the surface, and sinks into the soil, instead of flowing off. Crops which are sown broadcast require more water than those planted in drills or rows, as they require to be irrigated by flooding, which is usually a more wasteful method than that by ditches and lateral seepage, which is usually practiced in the latter case. Early sown crops require less water than those planted late, as they get the benefit of the spring rains and the moisture from the snows of winter. Less water is required when irrigation is performed late in the day or in the evening, than if done in the morning, owing to the excessive evaporation.

Of the principal crops cultivated in this region, oats require the most water, and corn the least. It has been found, that land, after having been thoroughly watered for a series of years, requires much less, and even none at all, in some cases. The explanation probably is that the subsoil becomes thoroughly

soaked, and yields its moisture, by capillary attraction, to the surface soil. If this be the case, the amelioration is but temporary.

Many authorities have written upon the question of the average duty of water; and the experience of all countries in which irrigation is practiced, has been compared. The almost unanimous result which has been reached is, that, with the great average of soils, climates, and crops, the duty of water—*i.e.*, the amount of land which can be watered by one cubic foot per second, flowing constantly throughout the season—should reach at least 200 acres. This conclusion was reached by the Hon. G. P. Marsh, in his well-known and able work, "Man and Nature;" by the commissioners on irrigation in the Sacramento and San Joaquin Valley;* and by the State Surveyor of California, W. H. Hall, in his report upon irrigation.†

This is a much greater duty than is attained anywhere in this country, with the exception of Southern California. There, water is very scarce, and the utmost economy in its use has, perforce, to be practiced. Irrigation has been carried on for centuries; and necessity, combined with long experience, has taught the inhabitants methods of economy. The duty is carried higher in this most arid region than in any other part of the earth. In some cases, it is made to go as high as 600, 800, or even 1,000 acres per second-foot. This but illustrates what can be done when the necessity arises.

In Colorado, the common practice is to allow an inch of water to an acre, *i. e.*, a duty of forty acres per second-foot. In Utah, the duty is higher, but nowhere does it reach 100 acres. In other parts of the West, the practice is as lavish as in Colorado. At this rate, agriculture will soon have reached its maximum development in the arid region, as the water will be entirely in use, and that to very poor advantage, watering one-fourth, or perhaps not more than one-fifth, of what it should serve. The productive power of this region will be very much restricted. Even now, the water of the South Platte is nearly all abstracted for irrigation, while several of its branches are used up entirely. Several of those of Utah and Nevada are used *in toto*. Heavy inroads have been made, too, upon many other of the Western streams, without a proportional redemption of land.

* House Ex. doc., No. 290. Forty-third Cong., First Session.
† Report of the State Engineer: Sacramento, 1880.

Aside from the bare fact, that crops will not grow without irrigation, there are certain advantages incident to the artificial application of water to the soil—advantages which commend themselves to farmers in more humid regions. The cultivator is entirely independent of the weather: droughts have no terrors for him. Again, the waters of irrigation come from the mountains charged with fertilizing material, which by evaporation they leave in the fields. Irrigated land thus needs no manure, and never wears out, the waste from the growth of crops being amply returned to the soil from the water of irrigation.

There are several methods in use of applying water to land, which are more or less applicable to diverse circumstances and different crops. Among them is that known as flooding, where a thin sheet of water is allowed to flow from the side ditches, completely covering the land. This method is varied in a number of ways: first, by flowing a thin sheet continuously, for a long time, allowing the water to run off as rapidly as it comes on; second, by flowing a deep sheet of water for a shorter time; and, third, by covering the surface with a standing flood, and allowing it to remain until it sinks into the ground. These different methods are often combined with one another, especially the second and third, which combination is used to a great extent in the Western country. Land can be prepared for the reception of water by this method much more cheaply and can be irrigated much more rapidly. It can, however, be used only on land which is smooth and horizontal, or nearly so. It is used almost entirely for crops sown broadcast, as the following method, by ditching, is used for crops sown in drills. In the ditching method, the water is conducted along small ditches, between the rows, and reaches the roots of the plants by lateral percolation. The ditches may be numerous and small, between each pair of rows; or they may be large and few in number. Again, they may be filled with water and allowed to stand, or the result may be attained by a continuous flow through them. This method is applicable to surface of all degrees of inclination, and it may even be quite rugged.

These two general methods are of almost universal application throughout the West. Other methods are employed in foreign countries, but very rarely, if at all, in the United States. Among them is that of underground or subsoil irrigation, where the water is supplied to the soil by filtration from an

underground ditch. A fourth method, and one employed only on a very limited scale, is by sprinkling, in imitation of nature's method.

The expense of irrigation differs with so many of the attendant circumstances that it is impossible to speak definitely upon the subject, except in detail. The relative scarcity of water, the cost of dams, main ditches, and other works, the expense of keeping things in repair, all modify the price. As a general thing, the ditch and other works are built and owned by a company, who sell the water at a certain price per miner's inch, per second-foot, or acre irrigated, to the farmers, as they might sell any other commodity. In 1876, the prices per inch of four of the principal ditch companies of Colorado were as follows:

Platte Water Canal Company.....	$3.00	Farmers' Ditch Company.....	$1.50
Table Mountain Company.....	1.50	Ralston Creek Ditch Company....	3.00

The San Joaquin and King's River Canal Co., California, sells water by the acre irrigated, and at prices which differ with the crops, as follows:

	Per acre.		Per acre.
For cereals	$2.50	For market gardens.....	$5.00
For alfalfa	3.00	For wild grass lands.....	.75

Many of the California companies charge a certain price per acre, averaging $1.25 for each watering. Many of the ditches have been constructed by the ranchmen themselves, who form companies for that purpose; while a third practice is that of bringing the water to the land and then selling the land, with the water-right attached, the owners of the land and water-rights forming a company for keeping the works in repair and for the proper distribution of the water. This plan was adopted in the Greeley colony, in Northern Colorado, and has worked admirably. The price of a water-right calculated to be sufficient for continuous irrigation of forty acres, is $300, to which must be added an annual charge of twenty-five cents per acre for keeping the works in repair.

It is a prevalent idea that large areas of the West may be redeemed by the promiscuous sinking of artesian wells, which are expected to bring to the surface great quantities of water. Many costly experiments in this direction have been made, with a net result of practical failure, and the sinking of immense

sums of money. The facts are, that there is not an unlimited supply of water in the bowels of Mother Earth; that water exists beneath the surface only under certain conditions of strata; that only under much rarer conditions is this water under a pressure which will force it to the surface when an opening is made; and that, even then, the quantity is very small, almost infinitesimal, in comparison with the requirements. A catalogue of the unsuccessful borings made in the West would fill a volume, and would outnumber, many times over, the number of flowing wells. They have been sunken in many parts of the West, on the Staked Plains of Texas, the Jornada del Muerto of New Mexico, in Colorado, Wyoming, Nevada, and California; and, while in a few cases water has been found in sufficient amount for railroad or domestic purposes, the failures vastly outnumber the successes; and in no case, except in Southern California, has the water been used for irrigation.

In certain portions of Southern California, artesian wells are used for irrigation to a considerable extent. Here the crops are very valuable, consisting of wine-grapes, oranges, and garden vegetables, and the duty of water, as was stated above, very high. In Los Angeles county, there are no less than 550 flowing wells, of a depth ranging from fifty to 500 feet. Some of these wells irrigate from 100 to 200 acres each; but one that will water forty acres is considered a very good one; while, on an average, each will serve about thirty acres. Their average discharge does not exceed one-tenth of a cubic foot per second, an amount of water which, at the rate at which this fluid is used in Colorado, would serve only four acres. The average cost of these wells has been about $400 each, giving, as the cost of a cubic foot of water per second, $4,000. This does not take into account the many failures to obtain water. Truly, as the State Engineer of California says, in summing up the matter, "It will be seen that the luxury is a somewhat expensive one."

Another matter which should be considered here is the probable effect upon the climate of the breaking up, planting, and watering of extensive areas of this country. The popular idea is that cultivation of the soil, and especially the planting of trees, tends to increase the rainfall. How this can produce such a result is not clear. There can be no doubt that a change is effected in the conditions of moisture of the soil and of the atmosphere. The breaking up of the soil by the plow, prevents

the moisture, whether from irrigation or from the heavens, from flowing off as rapidly, and causes a greater proportion to sink into the earth, or enter the atmosphere. The growth of vegetation acts in the same direction, and also protects the soil from evaporation. How far this merely preventive action will go towards ameliorating the conditions which relate to vegetable life, and whether it will finally obviate the necessity for irrigation, can not be foretold.

But little advance has been made in these Territories in manufacturing. Flouring mills and saw-mills are among the first establishments in the grain raising and timber regions of the Territories, as stamp mills, and smelting furnaces are in the mining districts. The following table gives some idea of the extent of manufacturing; but the figures for Idaho, Montana, and Arizona, for 1880, only represent the principal industries:

PROGRESS OF MANUFACTURING INDUSTRIES IN THE TERRITORIES.

Territories.	Years.	No. Establishments.	No. of Hands Empl'd.	Amount of Capital Invested.	Amount of Wages Paid.	Value of Material Used.	Value of Products Manufac'd.
Arizona*	1870	18	84	$150,700	$ 45,580	$110,060	$ 195,410
	1880	23	111	217,008	65,213	154,126	274,407
Dakota*	1870	17	91	79,300	21,106	105,997	178,570
	1880	83	505	423,850	213,995	1,195,282	1,789,988
Idaho*	1870	101	265	742,300	113,573	691,765	1,047,894
	1880	64	398	479,490	109,111	695,311	930,125
Montana*	1870	201	701	1,794,300	370,843	1,316,331	2,494,511
	1880	51	402	367,700	209,713	622,747	1,041,466
Utah	1850	14	51	44,400	9,984	397,381	391,929
	1860	148	289	444,356	231,701	436,512	960,128
	1870	533	1,554	1,491,600	395,285	1,395,359	3,243,019
	1880	1,088	3,221	3,339,468	711,657	2,105,095	4,217,484
Washington†	1860	53	270	1,206,200	452,801	508,081	1,408,881
	1870	269	1,026	1,998,974	574,998	1,405,126	3,251,088
	1880	350	1,231	2,840,511	699,988	1,985,060	4,120,783
Wyoming*	1870	25	108	299,400	247,378	280,126	733,494
	1880	30	377	1,946,160	417,094	808,173	1,301,381

The regions now left as Territories differ much in their quality from that already formed into States. We may, however, expect that the magnificent water-power and the rich soil of Southeastern Dakota will form a strong agricultural and manufacturing State. Manufactures and mining will be predominant in some mountain regions; and other rich spots will be found in States yet to crystallize out of the Territories.

* None in 1850 and 1860. † None in 1850.

Accustomed in the States to schools, churches, local newspapers, and other intellectual advantages, the great body of the population of the Territories no sooner take up their abodes in these new regions than they begin to organize for the establishment of like institutions. In New Mexico and Arizona the Spanish element has retarded the development of public schools, but as the tide of Anglo-Saxon, Teutonic and Scandinavian immigration continues to roll in upon these regions, the active educational ideas of these vigorous race-elements manifest themselves, and the schoolhouse rears its roof in the midst of every cluster of rude, primitive shops and dwellings. In the more northern Territories the territorial church and school history of Iowa, Kansas, and Nebraska, described in the chapters on those States, is fast repeating itself. The following table gives the principal educational statistics derived from the latest official sources, compared with similar statistics of earlier years:

Territories.	Census Years.	Whole No. of Schools.	No. of Academies.	No. of Colleges.	Total Cost.	Average Wages of Teachers
Idaho	1870	25	4	.....	$ 19,988.00	.....
	1880	135	15	.....	88,348.08	$45.60
Montana	1870	34	1	.....	9,720.70	56.80
	1880	178	6	.....	86,986.00	60.50
Washington	1860	53	.....	.....	.....	.....
	1870	170	2	1	.....	.....
	1880	365	16	1	.....	.....
Arizona	1870	10	.....	1	6,000.00	68.25
	1880	106	4	1	61,172.00	75.10
New Mexico	1860	21	.....	.....	.....	.....
	1870	44	3	1	.....	.....
Utah	1850	27	.....	.....	.....	.....
	1860	175	.....	.....	.....	.....
	1870	257	.....	.....	.....	.....
	1880	406	5	2	307,880.00	46.80
Dakota	1879	287	.....	.....	59,798.00	33.23
Wyoming	1876	21	.....	.....	.....	.....

Not long ago it was estimated that a generation must pass in privation and hardship before the social institutions of well-organized communities could be established in a new territory. It is not so now. When immigration traveled by ox-team, the blessings of civilization followed at slow pace. But now

the Western settler soon gathers about him the best forces of modern civilization. Often he puts upon the cars a full equipment for a comfortable homestead; and as to his social and domestic institutions, he sets them up like a ready-made house. There is a freedom and vigor in these new institutions like that which business men feel when they leave the shop and the factory, and camp for a summer's vacation in the woods among mountains and streams, in the pure, free air of the open country.

While our Western Territories have so much that is grand and inspiring in the majesty of their mountains and the breadth of their plains, in their rich mines, great forests, and broad acres, so long will they be the world's great recruiting ground for spirits tired and worn in the routine of the old communities and serve to recuperate and renew the vigor of our national growth.

CHAPTER III.

THE PACIFIC STATES.

The review of these four States is the story of the world's great hunt for gold. In the autumn of 1848—only a month or two after California was ceded by Mexico to the United States—an American settler erected a mill on the banks of the Sacramento river to grind his corn into food in that townless, roadless, and almost uninhabited region; and, as he dug a mill-course through his garden, he found gold! The precious yellow ore glittered, says one writer, in the shovelfuls of gravel which he tossed up. The sleepy Spaniards had been there for three centuries; yet they had never found it. So widely spread was the glittering ore, that at first it appeared everywhere: the soil teemed with it, as if the whole surface of the land consisted of the debris washed down from auriferous mountains: then, according to R. H. Patterson, the gold hunt began. From Europe, from the Atlantic States of America, even from China, an exodus took place—tens of thousands of adventurers rushing and racing to get first to the Golden Land. They came, crowded and half starving, in leaky ships, round by wild and stormy Cape Horn, a voyage of fifteen thousand miles. They forced their way across the Isthmus of Darien, struggling through the luxuriant jungles of the tropics, steaming like a vapor bath, and over the forest-clad mountain range, from whence Balboa first descried the new ocean of the Pacific—often losing their way among woods unopened by a glade and unpenetrated by any track, or perishing by fever and malaria. Most arduous of all was the route by land across the American continent. At that time the whole region west of the Mississippi river was untenanted save by the savage Red Men; while the broad plain, or basin, between the two parallel chains of the Rocky Mountains (where the Mormons had just settled beside the Salt Lake of Utah) was a waterless desert of burning sand, covered in some parts with glittering sheets of salt (emblem and cause of deso-

lation), across which the track of every caravan of emigrants was marked by the skeletons of mules and cattle, and often of the daring adventurers themselves.* So rapid was the progress of California, that only two years after the first accidental discovery of gold, the London *Times* (Nov. 19, 1850) stated that the population of that previously unoccupied country then amounted to about 250,000, and the export of gold to £12,000,000 per annum, adding that "almost all the accounts from the new region, although deemed exaggerations at first, have proved ultimately to have been understated."

It has been very truthfully said that geologists have an interesting field for study and research in the various gold-bearing gravel beds of California. These are distinct from the auriferous sands of the existing streams: they mark the course of ancient inundations, or of rivers which have long ago ceased to flow. They mark the course of extinct rivers, just as the boulders and detritus of moraines mark the course of extinct glaciers. The largest of these gravel beds is one running from Sierra county through Placer county, and which is crossed by the Pacific Railway at Gold Run. What a strange and striking picture presents itself to the mind's eye of any one standing there now! Far in front of him, across a mile of gravel bed, and stretching on either side out of view, busy miners and hydraulic appliances are at work where once a primeval river, a mile broad and proportionately deep, flowed in slow and stately course through a lonely valley, untenanted by any tribe of man. The mammoth, the great elk, and the moose-deer (the last named being the most ancient of surviving quadrupeds in North America) may have stood by the wide stream drinking their fill at morn and eventide, and with blank-gazing eyes beheld to the north the far-off mountains of quartz shooting their white pinnacles into the sky, thick-flaked with gold—a dazzling, glittering mass of light, visible from afar as the slanting sunshine gleamed on their snow-white sides and summits—whiter than any marble, and sparkling with gold. Next, these glittering mountains vanished, sinking in ruins into the bed of the great river. Then the sides of the valley, too, sank away, and the river itself disappeared, seeking lower channels; and finally, its old course was left on high ground, where only tiny rivulets are found, far too small to meet the wants of the miners now toiling

* *British Quarterly Review*, January, 1880.

in the dry bed of the vanished river—a mighty Pactolus of primeval times.*

Gold was discovered in Nevada as early as 1849; but ten years later, when the first important discovery of silver was made, the population of the still unorganized Territory was only about 1,000. After this, other and still richer discoveries followed in rapid succession. These mines and also those of Colorado are fully described in the chapters on Nevada and Colorado. Princely fortunes have been made in silver mining in a marvelously short time; while, on the other hand, vast sums have been spent fruitlessly in the search for such fortunes. It was in 1874 that the "Big Bonanza," in the Comstock Lode, the richest in the world, was discovered. The hardy and keen-eyed prospectors roving in that desolate region suddenly spied silver veins cropping out of a lofty branch of the Washoe Mountains. Near where Virginia City now stands, silver was descried on the slope of Mount Davidson. This fortunate discovery was quickly followed by an era of mining excitement, with consequences extending to every money centre of this country and Europe. A large number of silver mines are at present worked successfully along a line of nearly two miles upon this mountain.

As in Nevada, so in Colorado, the mining of precious metals is to-day, and probably will continue to be, the principal interest of the State. The recent astonishing discoveries at Leadville, Colorado, have proved only second in importance to those in Nevada. A more detailed account of both of these discoveries will be found hereafter.

The annual product of lead, silver, and gold, in the States and Territories west of the Missouri during the past ten years, has been as follows:

Year.	Amount.	Year.	Amount.
1870	$53,150,000	1877	$95,811,582
1871	55,784,000	1878	78,276,167
1872	60,351,824	1879	72,688,888
1873	70,139,860	1880	77,233,512
1874	71,965,610		
1875	76,708,433	Total	$798,323,735
1876	87,919,859		

The product of the United States since the discovery of gold in California, as compared with the rest of the world, will be found in the following statement:

* *Edinburgh Review*, January, 1879.

Countries.	Gold.	Silver.	Totals.
United States	$1,410,000,000	$370,000,000	$1,780,000,000
Australia	1,260,000,000		1,260,000,000
Spanish America	100,000,000	800,000,000	900,000,000
Russia	465,000,000	15,000,000	480,000,000
Other countries	55,000,000	275,000,000	330,000,000
Totals	$3,290,000,000	$1,460,000,000	$4,750,000,000

The product of the precious metals in the four Pacific States, for 1880, was as indicated below:

California	$18,276,166	Oregon	$ 1,059,641
Colorado	21,284,969		
Nevada	15,081,621	Total	$55,652,417

Though mining is the first industry of these four States, it is by no means the only one. The areas of California, Colorado, Oregon, and Nevada, compared with that of the whole United States, are as follows:

States.	Area, square miles.	Area, acres.
California	158,360	101,350,400
Colorado	103,925	66,512,000
Oregon	96,030	61,459,200
Nevada	110,700	70,848,000
Totals	469,015	300,169,600
Totals for United States	3,025,600	1,936,384,000

Prior to 1850, few besides adventurers and savages populated this area of three hundred million acres; and to-day the population only exceeds by a trifle one million and a quarter.

POPULATION.

States.	1880.	1870.	1860.	1850.
California	864,686	560,247	379,994	92,597
Colorado	194,469	39,864	34,277	.....
Oregon	174,767	90,923	52,465	13,294
Nevada	62,265	42,491	6,857	.....
Totals	1,296,187	733,525	473,593	105,891

As in all new States, the male sex largely predominates.

MALES IN EXCESS.

States.	Per cent of excess.	States.	Per cent. of excess.
California	49.0	Oregon	44.8
Colorado	43.6	Nevada	128.0

As denoted in the following table, the population of California is more than fifty per cent., and that of Nevada fully seventy per cent., foreign born:

States.	Per cent. of foreign pop.	States.	Per cent. of foreign pop.
California	51	Oregon	21
Colorado	25	Nevada	70

In California, as will be seen in the chapter on that State, over one hundred thousand of the population are Chinese.

The Census of 1880 shows that the following number of acres of land were in cultivation with the six cereal crops:

ACRES IN CEREALS.

States.	Corn.	Wheat.	Oats.	Barley.	Rye.	Buckwh't
California	71,781	1,832,429	49,947	586,340	20,281	1,012
Colorado	22,991	64,693	23,023	4,112	1,294	8
Oregon	5,646	445,077	151,634	29,811	841	372
Nevada	487	3,674	5,937	19,399	.....	.....
Totals	100,905	2,345,873	230,531	639,162	22,416	1,392
Totals in U. S.	62,368,327	35,430,052	16,144,593	1,997,717	1,842,308	848,389

The cereal crops in this region are constantly growing in importance, having, as the following table shows, almost doubled in the past ten years:

States.	Total Cereal Product, in Bushels.				
	1880.	1870.	Per cent. of increase.	1880.	Per cent. of increase.
California	12,026,687	28,487,124	135.86	45,135,853	58.37
Colorado	.....	863,871	.....	2,648,573	206.59
Oregon	1,830,378	4,659,054	155.90	12,983,019	178.00
Nevada	6,868	591,189	8,507.73	782,519	32.36
Totals	13,853,783	34,901,238	150.49	61,499,963	77.74

Wheat is the great California and Oregon crop, and, as the subjoined table will show, the yield is steadily increasing:

States.	Wheat.				
	1860.	1870.	Per cent. of increase.	1880.	Per cent. of increase.
California	5,928,470	16,676,702	181.29	29,017,707	79.99
Colorado	.....	258,474	.....	1,435,014	453.09
Oregon	836,776	2,340,746	188.12	7,480,010	219.55
Nevada	3,681	228,866	6,203.11	69,298	*69.72
Totals	6,758,877	19,504,788	188.58	37,992,029	94.78

States.	Corn.				
	1860.	1870.	Per cent. of increase.	1880.	Per cent. of increase.
California	510,708	1,221,223	139.12	1,998,335	63.23
Colorado	.....	231,903	.....	455,968	96.62
Oregon	76,123	72,138	*5.23	126,863	75.86
Nevada	460	9,660	2,000.00	13,891	38.44
Totals	587,290	1,534,923	161.36	2,589,046	68.67

The stock raising interests are yearly becoming of more importance, especially in California, Oregon, and Colorado. The Tenth Census will give the following estimate of cattle, sheep, and swine, in these four States:†

States.	Cattle.	Sheep.	Swine.
California	814,292	7,059,833	868,059
Colorado	800,000	1,000,000	20,000
Oregon	598,007	1,403,436	179,195
Nevada	283,900	278,000	20,500
Totals	2,496,199	9,741,269	1,087,754

Elsewhere I speak in detail of the principal manufactures of each of the Pacific States; here I simply present in tabular form the principal statistics collected by the Census Bureau upon this subject for the Census years 1850, 1860, 1870 and 1880. The progress of these States in this regard, as indicated by these figures, is certainly full of encouragement. It will be observed

* Decrease.

† For revised Census statistics, see Appendix.

that the product of this class of industries in 1880 is estimated at nearly double the product of 1870.

PROGRESS OF MANUFACTURING INDUSTRIES IN THE FOUR PACIFIC STATES.

States.	Years.	No. of Establishments.	No. of Hands Empl'd.	Amount of Capital Invested.	Amount of Wages Paid.	Value of Materials Used.	Value of Products Manufac'd.
California	1860	1,008	3,964	$ 1,005,197	$ 2,717,180	$ 1,201,154	$12,089,589
	1860	3,466	49,236	22,043,066	26,402,267	27,051,674	62,252,289
	1870	8,994	35,302	20,726,902	13,136,722	35,261,103	66,594,586
	1880	6,374	38,066	63,565,125	19,705,065	49,491,089	109,981,017
Colorado	1850	.....	.....	.....	.....	.....	.....
	1860	.....	.....	.....	.....	.....	.....
	1870	256	976	2,035,605	593,287	1,563,980	2,952,980
	1880	460	1,664	3,812,990	1,008,880	2,807,904	5,047,972
Nevada	1850	.....	.....	.....	.....	.....	.....
	1860	.....	.....	.....	.....	.....	.....
	1870	330	2,850	5,127,720	2,498,472	10,515,984	15,970,230
	1880	594	5,220	9,047,913	4,497,351	16,505,574	22,534,468
Oregon	1850	69	265	243,600	288,480	809,560	2,236,640
	1860	309	976	1,397,286	635,256	1,431,932	2,976,781
	1870	989	2,894	4,376,940	1,180,176	5,419,736	6,977,397
	1880	1,744	6,056	12,474,019	2,016,311	6,155,580	13,342,139

The construction of railroads is much more difficult and expensive in this region than in a prairie country; but, as the following statement of railroad mileage in these four States plainly shows, the resistless energy of the Western population laughs at all barriers in the path of its industrial and commercial progress:

States.	Miles of Railroad in 1880.	States.	Miles of Railroad in 1880.
California	2,220	Nevada	769
Colorado	1,531		
Oregon	582	Total	5,102

These States, with their important cities of San Francisco, Denver, Leadville, Portland, and Virginia City, have been barely skeletonized in this chapter: in the proper place their importance will be more fully set forth.

CHAPTER IV.

STATE OF OHIO.

OHIO has been aptly styled "The Gateway of the West." Bounded on the east by Pennsylvania, with its immense riches in agriculture, mines, manufactures and trade; on the west by the prosperous State of Indiana; on the north by Lake Erie; and on the south and southeast by the Ohio river—with the center of the population of the Union just beyond her border, she sits, as it were, in the very lap of the wealth of the "Great Republic;" and, gathering nearly all the through lines of travel and traffic between the harvest-laden West and the markets of the world in her grasp, not only enjoys unwonted means of transportation for her own productions, but levies contribution on a commerce of enormous proportions, that is incessantly hurrying to and fro across her domain from regions beyond. The northern extreme of Ohio is in north latitude 42°, while the southern extreme touches 38° 30′. Its eastern limit is the meridian of 80° 30′ west longitude, and its western limit is that of 84° 50′. Its greatest length and breadth are 220 and 210 miles respectively. Its area, according to the Tenth Census, is 41,060 square miles; equaling 26,278,400 acres, of which not less than 25,312,937 acres are rated as taxable.

The surface of the country presents no great geological up-lifts or mountain ranges. Its general character is that of a table-land, crossed by a low range of hills, running from a little south of the northeastern corner of the State to the Indiana line, near its intersection with the 40th parallel of latitude. This ridge, in no place more than 1,491 feet above tide-water (an altitude reached at Zoar's Station, Tuscarawas county), forms the divide between the tributaries of Lake Erie and the Ohio. Northward the land is generally level, sloping down gradually to the surface of the lake, whose mean level is 573 feet* above the ocean. Southward,

* According to the recent government determination of the levels between tide-water in the Hudson and the mean level of the Lakes.

over a considerable area, embracing the central part of the State, the country is a nearly level plain, in some places so flat as to require artificial drainage. Farther south, the surface grows more and more uneven, until along the Ohio river it is decidedly hilly. The beautiful river bluffs, broken or rounded into nearly every conceivable form, rise to heights of 250 to 600 feet above the water. Here and there deep channels have been furrowed through them by creeks and rivers that have come down from the interior through delightful vales or romantic, rock-walled defiles, worn out by the impetuous spring-time and autumn freshets. The State is indebted mainly to these water-worn features for its pleasing diversity of surface.

Ohio is abundantly watered. From the dividing ridge already described several considerable rivers pour the treasures of innumerable springs northward into the great upper basins of the St. Lawrence, or southward into the turbid bosom of the Ohio. On their way, they receive tribute from countless creeks and rivulets—the wealth-infusing veins of this fertile land—which seam it in every direction. Artificial irrigation is something Ohio will never need to study, if she takes proper care of the forests that shade her native urns and hill-hidden fountains. The cloud-winged treasures of the Gulf and of the Lakes distill their fruitful showers over all the land in a rainfall that averages forty inches per annum. With such numerous natural aqueducts, artificial drainage is seldom either necessary or difficult. Few of these interior rivers are navigable for any considerable distance. This is usually because of rapids, which multiply cheap water power, that to-day is driving thousands of saws, mill stones, lathes and looms, and whirling myriads of spindles.

The principal streams that run to the Ohio river are the Scioto, navigable in the rainy season for 130 miles; the Great Miami, seventy-five miles; the Muskingum, navigable as far as Coshocton, 110 miles; and the Hocking, some eighty miles long and quite deep for considerable distances, but in many places broken by rapids. The Little Scioto, Brush, and other feeders of the Ohio, are barely boatable a part of each year. The main tributaries of Lake Erie from this State are the Maumee, known in Indian annals as the Miami of the Lakes, the Portage, the Sandusky, the Huron, the Vermillion, the Black, the Cuyahoga, the Rocky, the Chagrin, and the Grand. Of these, the first is navigable eighteen miles by good-sized lake steamers, and by

smaller craft a short distance further; the second is navigable twelve miles; the fourth, fourteen miles. Others afford valuable water power, and, by the aid of the general government, all have been converted, at their confluence with the lake, into good harbors; conspicuous among which is the port of Cleveland, at the mouth of the Cuyahoga.

Of all the extensive, well-watered, and agreeably diversified surface of Ohio, less than two per cent. is uncultivable. The soil, the chief element of its prosperity, is for the most part a rich, friable loam, with a light, clay subsoil on the hills, and marl, or rich drift and alluvium, in the valleys. The extreme southern projection of the State, between the Scioto and Hocking valleys, embracing Lawrence, Gallia, Meigs, and the most of Jackson and Vinton counties, is covered with native soil, unenriched with the fertile deposits of the drift and alluvial periods. So also are a narrow section, taking in the southwestern part of Washington county and a portion of Morgan, on the divide between the Hocking and the Muskingum; two small circles, far up the Muskingum, in Tuscarawas, Holmes and Coshocton counties; and the entire area of Monroe, Belmont and Jefferson, and the greater parts of Guernsey, Noble, Harrison, Carroll, and a part of Columbiana counties, grouped along the Ohio river, between Marietta and the Pennsylvania line. Besides this, there is an area, about equal to Highland county, which takes in the southern part of that county and the adjacent upper corners of Adams and Brown. These are by no means the most fertile parts of Ohio.

On the other hand, the highly productive valleys adjacent to these, along the lower Miamis and the Muskingum, are covered mainly with a mixture of native soil, drift and alluvium. The remainder of the State south of the Erie water-shed has a soil composed of drift, in which stratified beds of sand and gravel abound; while the Erie slope is drift, destitute of sand and gravel, but abounding in deposits of blue clay.

A careful study of the geology of the broad region between the Pennsylvania line and the Wabash, Western Tennessee, and the Lakes, has discovered that the several layers of stratified rocks overlying this country were at some comparatively recent time—geologically speaking—upheaved into a low mountain ridge, that stretched from the neighborhood of Nashville, Tennessee, to Erie, Pennsylvania. As the eons of the earth's

genesis wore on, the incessant hammering of the elements beat down this immense arch between the West and the East, pulverizing and washing away stratum after stratum, and depositing the detritus—the clays, the marls and the sand beds—down the flanks of the ridges and along the valleys, where this covering has helped to preserve these same strata as they are found to-day, dipping in anticlinal directions to the northwest and southeast, resting upon each other in the following order: Beginning at Cincinnati, with what is now familiar to all geologists as the Cincinnati group, the oldest stratified rocks in the State, as one travels up the Ohio, he finds, after some miles, first a thin stratum of the Clinton group, next the Niagara group, then an outcrop of Huron shales, then the Salina group. The Oriskany, the Corniferous limestone and the Hamilton groups, which farther north in the State crop out below the Huron shales, and the Erie shales, belonging above the latter, do not appear in Southern Ohio, where the Waverly directly overlies the Huron shales, and is itself overlaid, farther east, by the Lower Carboniferous, beyond which, for miles and miles, until the Pennsylvania line is reached, stretch the Carboniferous conglomerate and the Coal measures. These latter formations cover about one-third of the State, bounded on the east and south by the Pennsylvania line and the Ohio, and on the north and west by a broken line crossing the southern edge of Trumbull county into Portage, running thence almost due north along the east line of Geauga county for some twelve miles, thence abruptly southward, including about two-thirds of Wayne, the eastern borders of Licking, Fairfield and Hocking counties, very nearly all of Jackson, and the eastern half of Scioto, and striking the Ohio river a few miles above Portsmouth.

When first invaded by the white settlers nearly the entire surface of Ohio was covered with forests. A few patches of prairie lay here and there—astray, as it were, from the vast natural meadows, or prairies, of Illinois, and lost in the apparently interminable woods. Most of these were in the northern part of the State. Almost one-third of Ohio is still endowed with abundance of timber, a productive fund invested by nature, valuable in itself and invaluable in its influence on climate and production. Of the 20,178,155 acres returned in the assessor's rolls for 1879, 5,101,441 were woodland. The distribution of the forests, according to this authority, is so general that but

twelve counties report less than 40,000 acres each, and only nine report over 80,000, of which but two have more than 100,000 acres. The most heavily timbered counties lie along the Ohio river, south of a line drawn from Belmont to Adams; on the upper waters of the Muskingum; and in the northwestern part of the State, in the triangle formed by the State boundaries and a line drawn from Upper Sandusky to the southeast corner of Preble county. The principal varieties of forest trees are oak, poplar, ash, sugar maple, walnut, chestnut, beech, hickory, elm, sycamore, dogwood, hackberry, paw-paw and ironwood. Mr. John Hussey, a high authority, says: "There is no tree peculiar to this State, and no variety that attains its greatest perfection here, owing to the location of Ohio on the border of the northern and southern timber regions." Yet much of the native timber of these woods is of noble proportions. Oak, elm, sycamore and whitewood logs four and five feet in diameter are not rare, while oaks of six feet do not occasion surprise. A sycamore in Columbia township (Lorain county) is thirty-three feet and four inches in circumference.

One of the greatest of nature's boons to Ohio is its climate. In the southern part, above the river valley, it is not quite so mild, judged by the mean temperature chart of the Smithsonian Institute, as that of the Atlantic seaboard in the same latitudes, but in the northern part of the State the mean temperature is almost identical with that on the same parallels on the Atlantic coast. The fierce hyperborean blasts, sweeping down from the frozen wastes of British America, are turned aside or tempered to comparative mildness before they pass the inland sea that shields Ohio on the north. The vapor of the lake is converted into snow, that blankets her wheat farms and enriches her corn fields. Extreme cold is not infrequent for a few days at a time, and sudden and great changes often take place, particularly in the north. The Ohio river, being from 250 to 600 feet lower than the lands a short distance back, is less subject to extremes of temperature than places farther north. Urbana, Ohio, is located in latitude 40° 6′ N., but ten miles north of Philadelphia, and in longitude 83° 43′ west, at an elevation of 1,044 feet above tide water. Observations recorded here may therefore be received as a fair mean standard for the State. Of 1,095 observations of the course of the wind, made at this point by M. G. Williams, during the year ending Dec. 31, 1878, 473

are marked "calm," and over forty-nine per cent. of the remaining 622 record the wind as between S. E. and S. W., showing a prevalence of mild or warm winds. Even in the 536 records made in the first three and last three months of 1878, 225 are "calm," and fifty-nine per cent. of the remainder report the wind out of the south, between S. E. and S. W. During the extended period of forty-seven years, 1832 to 1878 inclusive, the mean temperature of the winter months was 28.27° Fahr. in January; 30.67° in February; and 30.38° in December. The minimum temperature within that period was 26° Fahr. in January, 1873; and in the whole period of nearly half a century, the temperature fell to 15° or below but ten times. For the same series of years the mean temperature of June was 69.43°; of July, 73.49°; of August, 71.03°. The maximum was 97.49°, a point reached twice in the summer of 1854, and once each in 1856 and 1858. Mr. Lorin Blodgett, in the Topographical Atlas of Ohio, says that during the summers, generally, the river valleys have an average temperature of 73° to 75°; the level and central portions, 72° to 80°; and the lake border, 70° to 72°. "A peculiar mildness of climate belongs to Kelly's Island, Sandusky and Toledo. Here, both in winter and summer, the climate is 2° warmer than on the highland ridge extending from Norwalk and Oberlin to Hudson and the northeastern border." The treasures of the rain and snow are meted out to Ohio, as I have before intimated, in fruitful abundance. The rainfall at Urbana, during a series of twenty-seven years, ending Dec. 31, 1878, averaged 39.83 inches. This includes a mean of 34.38 inches of snow. The value of these bounties of nature depends greatly on their distribution. Here, again, the register of the watchful meteorologist reveals one of the prime secrets of Ohio's prolific corn and wheat fields. In the twenty-seven years above specified, the average annual number of days of snow-fall was thirty-eight; of rainy days, 104; of cloudy days, fifty-four; of fair weather, 135; and of bright, clear weather, thirty-four. True, Mr. Blodgett says: "The actual rainfall of Ohio in different months and years varies greatly. There may be none in a month, and again the quantity may rise to twelve or fifteen inches in a single month; and for a year the variation may be from a minimum of twenty-two or twenty-five inches to a maximum of fifty or even sixty inches in the southern part of the State, and forty-five to forty-eight inches along the lake border."

But these extremes do not occur frequently. One of the most careful observers, Dr. D. Drake, reported the following as the mean of thirteen years' observations at Cincinnati, for each month: January, 3.19 inches; February, 3; March, 3.27; April, 3.5; May, 5.12; June, 5.75; July, 4.78; August, 4.58; September, 3.42; October, 3.64; November, 3.73; and December, 3.72 inches. This denotes a fall of 9.87 inches in the spring months; of 15.11 in the summer; of 10.88 in the autumn; and of 10.91 in the winter. The rainfall at Philadelphia for the same thirteen years averaged 45.24 inches per annum. The annual rainfall at St. Petersburg is nineteen inches; at Paris and Rome, twenty-one inches; at London, twenty-seven; for all England, thirty; and at Naples, thirty-seven inches. In the tropics, it is often sixty inches in a month, and as much as two hundred during the year. While the Urbana observations give us a fair average of the rainfall for the State, considered as a unit, all who are studying the relations of climate and soils to crops will be interested to know that the average is materially greater in the most productive corn districts, in the southwest angle of Ohio, than in the dairy and vineyard region, in the extreme north. In the first tier of counties skirting Lake Erie, the average rainfall is but thirty-two inches; in the next tier back it is thirty-four; in the third tier, it is thirty-six; in the next tier, and in the counties bordering the Ohio river as far down as Washington county, it is thirty-eight inches. Southward and westward of this boundary, extending to the Indiana line, is a broad area with an average of forty inches of rain. This is limited on the southwest by a line drawn from near the southwest corner of Van Wert county to the center of Meigs. Southward of this, at distances of fifty miles apart, draw two parallel lines. Within these belts, the average rainfall is forty-two, forty-four and forty-six inches, respectively; the heaviest amount being in the five southwestern counties, noted for their immense yields of corn.

Important as are the effects of climate on crops, this consideration pales in comparison with the question, Is it salubrious? The vital statistics for the year ending March 31, 1879, make the following significant answer: Of the 28,179 decedents reported by the probate judges for that year, 481, or more than fourteen per cent., had lived beyond three-score years and ten. Subtracting those who died under ten years of age, more than thirty-

three per cent. of the remainder lived beyond seventy; over sixteen per cent. beyond eighty; and thirty-seven of the whole number survived beyond 100 years. Of the total 28,179 deaths, a little over twenty-two per cent. were from miasmatic infections, contagious and epidemic causes, (more than half of these resulting from diphtheria, scarlatina and cholera infantum); twelve per cent. were from consumption, and about six per cent. from other lung diseases. The vital tables plainly show that with the settlement of the country the death rate is diminishing. This may be attributed partly to the drainage of the swamp lands, the clearing of forests and the close grazing of bottom lands, and partly to the increased ratio of natives exempt from the strain of acclimation incident to immigration.

Of the native animals that roamed through the forests and glades of Ohio a hundred years ago and supplied its only articles of export, very few representatives remain. The common deer is still abundant in the most thickly wooded districts; and the black bear, wolf, and wild-cat, or lynx, are occasionally found in the few rough, broken parts of the country. The raccoon, rabbit, squirrel and other small game are quite plenty. But other quadrupeds, once so numerous here, the panther, the bison and the elk, are gone, like the race of fleet-footed hunters that once pursued them through the sylvan aisles. Professor E. D. Cope, of the Academy of Natural Sciences, Philadelphia, says that there are 525 species of fauna indigenous to the State of Ohio. This is only twenty-five less than the total zoölogical species of Pennsylvania, which comprehend a number of marine species. The mammalia include fifty-four species of quadrupeds; 263 of birds; thirty-nine of reptiles; thirty-one batrachia, (frogs, etc.); 134 fishes; two lampreys. The principal birds are the thrush, wood-warbler, mocking bird, bobolink, hang-nest, hawks of several species, one species of vulture—the turkey-buzzard—the wild turkey, the wild goose, two species of grouse, a partridge, a heron, the grass-snipe, the true snipe, woodcock, ducks, loons and gulls. The reptiles include several species of tortoise and twenty-three of snakes. Only three of the latter are venomous, the copperhead, the massassauga rattlesnake and the common rattlesnake, confined now to the least-cultivated regions. Of the fishes, sixty-eight species are good for food; the principal ones being white perch, yellow perch, striped bass, green bass, black bass, sun-fish, pike, including

the delicious muskallonge, cat-fish—frequently weighing 150 pounds—brook trout, lake trout, whitefish, carp, sucker and chub. The State contains 25,000 species of insects, embracing several kinds that are often seriously injurious to vegetation. Of domestic animals, only the horse, the cat, and the dog were found among the Indians, having been introduced from the European settlements in the South and the East.

Such, in natural resources—in geographical position and extent, in soils, in climate, in her rivers, her virgin mines and quarries, her botany and zoölogy—was Ohio when ceded by Great Britain to the United States, in 1783. So she continued until after Virginia relinquished her claim to the Northwest Territory in 1784; and still later, when the great ordinance of 1787, the "Bill of Rights" of the then unborn millions who have since inherited the great West, was enacted by Congress, and this territory was thrown open for settlement. Not until the subsequent year, 1788, was the first permanent white settlement made in Ohio. That was ninety-two years ago, and now this single State, that must wait nearly two lustrums longer before she can celebrate her first centennial, contains a population of 3,198,239, or several hundred thousand more than the whole Union could boast when it struck for independence.

Mr. H. S. Knapp, in his history of the Maumee valley, says that the first efforts by Europeans to settle within the present limits of Ohio were made in 1680. That would be just 200 years ago. It is true that Count Frontenac, then Governor General of Canada, as early as 1679 urged the French monarch to erect forts and trading posts in the West; and, although he received no support from his royal master, he sent out a number of trading parties, one of which erected a stockade below the site of Maumee City. This became a profitable trading post, and is spoken of in the old French records as under the command of Sieur Courthemanche in 1694. It was finally abandoned for a more eligible site at the head of the Maumee, near the present city of Fort Wayne, Indiana. Surely, neither this nor the similar rude stockades subsequently erected at several other points in Northern Ohio and Indiana, for the protection of the fur traders, and "*coureurs des bois*," could be fairly characterized as European settlements. I have already described this class of men. They were adventurers, not immigrants. They were intent only on peddling their goods for furs, and living beyond

arms' length of the restraints of civilization. They were nomads, making their homes—if they could be said to remain anywhere long enough to have homes—with the Indians; migrating hither and thither with them, and no more entitled to be called "settlers" than the aborigines. The *bona-fide* settlers of Ohio were men of an entirely different mould. It has been well said of them: "They were born under a monarchy; fought the battle of Independence; assisted in the baptism of a grand republic; then moved into a wilderness and laid the foundations of a State, itself almost an empire."

In 1786, the Ohio Company was organized in New England. This company contracted with Congress for 1,500,000 acres of land on the Ohio, including the mouths of the Muskingum and the Hocking, for $1,000,000. The most of the company were revolutionary soldiers, and held an abundance of continental scrip, which they offered in payment for the lands. This contract was executed in November, 1787, and Gen. Rufus Putnam and a number of other colonists made what I have above termed the first permanent white settlement in Ohio, at Marietta, near the mouth of the Muskingum, in April of 1788. "Most of these colonists," says Judge Burnet (himself one of the early settlers of Cincinnati), were men of distinction and energy." As soon as they had provided shelter for themselves and families, they organized a church and established a school by voluntary contributions. Two entire townships were reserved out of their grant for the foundation of an academy or "university," and two others for the support of schools and "religion." This example was followed by subsequent colonists in other places. Such was the spirit of the early settlers of Ohio—both those who made the first "clearings" on the Ohio river, and those who entered the "Western Reserve," at the northern extreme of the wilderness. In this fact is discovered one of the causes of that thrifty, healthy growth which has since extended through the entire West, now a land of schools and churches, good laws and morals, as well as of immense wealth.

In October, 1788, John Cleves Symmes contracted with Congress for 1,000,000 acres along the Ohio, between the Great and the Little Miamis. Soon afterwards he sold the land on which Cincinnati now stands to Matthias Denman and Mr. Filson of Kentucky, for laying out a town. The site was surveyed during the next winter, 1788–89; the corners of the lots and the streets

being "blazed," in Indian fashion, on the giant trees of the magnificent forest that then covered the plateau, encircled with hills 300 feet high, on which the "Queen City" now stands. In this chrysalis period of its existence, the present emporium of the Ohio valley was known by the euphonious name of Losantiville, which its putative fathers no doubt intended as a guide to the backwoodsmen of Kentucky, already familiar with the salt licks of the sinuous Licking river, who might be in search of this infant Moses of the West. Of course, the scholarly backwoodsmen would at once recognize that this happy compound of the initial of their beautiful river with the Latin words *os* and *anti* and the French *ville*, signified "a city opposite the mouth of the Licking." Fortunately, Governor St. Clair changed its name, a few months later, to Cincinnati, in honor of the order of Cincinnatus, to which he belonged.

Columbia, at the mouth of the Little Miami, was begun by the erection of a block house in November, 1788—antedating the platting of Cincinnati by a few days. In the following February, Mr. Symmes laid out a town at the southern extreme of his purchase, just above the mouth of the Great Miami. The spring freshets completely inundated it and drove the ambitious founder farther up the Ohio, to North Bend, where he platted what he fondly hoped would become an immense city, extending entirely across the isthmus between the Miami and the Ohio. It was christened Symmes City. Thus, Marietta, Columbia, Cincinnati and Symmes City were founded within a period of ten months, each hopeful of becoming the metropolis of the West. Marietta was by a few months the oldest, and here Gen. Arthur St. Clair located, on the 9th of July, 1789, when he arrived to set up the government of the Northwest Territory, the first purely civil government ever established between the Great Lakes and the Ohio. For a time, Symmes City contained more inhabitants than Cincinnati, and jealousy ran high between the rival villages, until the commandant of the government troops, having been induced to remove to Cincinnati and erect Fort Washington at that point, sealed the doom of the slighted city, which now exists only upon the pages of the earliest chronicles. Judge Symmes always insisted that in this, as in many other fateful events of history, doom waited on a woman's smile. Paris bore away Helen, Troy received the guilty pair and perished; Menelaus Symmes complained that a Symmes City Helen, removing to

Cincinnati, drew the gallant commandant after her. Mark, however, the difference in the results; Cincinnati received them and waxed mightier than before, while Symmes City has gone to join Troy, Carthage, and those other ancient emporiums for which poets now and then inquire, crying "Where are they?" and only mocking echo answers, mildly repeating "Where?"

Indian troubles began as soon as these settlements were commenced. Mr. Filson, mentioned above as one of the original grantees of the Cincinnati purchase, was killed in 1789, while engaged in surveying a part of his grant. Savage raids and massacres multiplied rapidly. For years settlers were afraid to venture far from their villages, except in armed bodies; and farming was restricted to the neighborhood of forts and block houses. The region between the two Miamis became known as "The Miami slaughter pen." Not until two disastrous military campaigns, one under General Harmar in 1790, and another under Governor St. Clair in 1791, was the general government aroused to the necessity of a great effort to subdue the savages. In 1794, Gen. Anthony Wayne, of revolutionary fame, with 2,000 regular troops and 1,500 mounted riflemen, Kentucky volunteers, defeated the combined tribes of the Northwest, in a bloody battle near the site of Fort Wayne, Indiana. The following year they sued for peace, and General Wayne dictated the terms of a treaty, signed at Greenville, Ohio, by all the tribes claiming country east of the Mississippi and north of the Ohio river, relinquishing title to nearly all the present territory of this State and a strip along the eastern side of Indiana, besides several small tracts in Michigan and Illinois.

Almost immediately after the promulgation of this treaty, which resulted in a long term of peace, not seriously disturbed until nearly twenty years later, during our second war with Great Britain, immigration, which had been well-nigh totally arrested, poured in upon the fertile plains and down the luxuriant valleys of Ohio with great rapidity. No census of the population was taken in 1790, but from the best data I can find, it is evident it had increased, within about two years, from the little band that wended its way by painful marches through the mountain passes of Pennsylvania and West Virginia to the Monongahela, and descended thence to Marietta, to some 3,000. Before the end of 1798, notwithstanding the retarding effects of five years of Indian wars, there were eight organized counties, includ-

ing Wayne county, which embraced, besides the northwest corner of Ohio, parts of Northeastern Indiana and Michigan, and Kaskaskia county, covering the most of what is now Illinois. The ordinance of 1787 provided, that, when satisfactory evidence was given that either of the three divisions defined therein to be erected in due time into as many distinct States, contained 5,000 free *male* inhabitants, it should be entitled to elect a Territorial legislature. Such a population was found within the limits of Ohio in 1798, and, an election having been held, in conformity with the provisions of the ordinance, the first legislature met at Cincinnati, Sept. 16, 1799. The moral disposition and far-seeing political sagacity of those hirsute, sunburnt and homespun-clad statesmen of the backwoods, engaged in laying the foundations of what has proved to be one of the most virtuous and prosperous commonwealths of modern times, are manifested by their refusal to authorize lotteries for public purposes, however meritorious these purposes might be; and by an address to the people, just entering upon self-government, closing with these memorable words: "Religion, morality, and knowledge are necessary to all good government. Let us therefore inculcate the principles of humanity, benevolence, honesty and punctuality in dealing, sincerity, charity, and all the affections." It is hardly surprising, that, starting in this spirit, Ohio has never been beguiled by the siren of repudiation into a disregard of the precepts of the fathers, and that she early made liberal provisions for public schools and higher institutions of learning, so that in 1880, out of a population of nearly three and a quarter millions, there are but few who can not read. This legislature adjourned just twelve days before the advent of the new century, which opened upon Ohio in the full enjoyment of laws of her own making, or approval.

On the 7th of the following May, Congress having duly recognized the Territorial organization of Ohio, the rest of the region that had shared with her in the government of the Northwest Territory was erected into the Territory of Indiana.*

How rapidly Ohio has developed from this beginning of its Territorial epoch, at the day-spring of the present century, down through its State history, begun in 1803, to the present

* For a short time all that portion of the present States of Ohio and Michigan east of the western boundary line of Ohio extended northward to the international boundary line, and north of a line drawn due east from the southern extremity of Lake Michigan, was not attached to Indiana Territory, but Congress soon added it to that jurisdiction.

year, is unfolded in the following table, giving its population at nine decennial periods, and the percentage of increase from period to period:

Census Years.	White.	Colored.	Total.	Per cent. increase.
1800	45,028	337	45,365	.....
1810	228,861	1,899	230,760	409
1820	576,572	4,882	581,434	152
1830	928,329	9,574	937,903	61
1840	1,502,122	17,345	1,519,467	62
1850	1,955,050	25,279	1,980,329	30
1860	2,302,808	36,673	2,339,511	18
1870	2,601,946	63,213	2,665,260	13+
1880	3,100,000	98,239	3,198,239	16+

Ohio is the first State (except Vermont) that came into the Union entirely exempt from slavery, and in which a slave was never owned.

According to the last census, then, Ohio stands third in rank of population among the States of the American Union, and contains nearly one-fifteenth of all its inhabitants.

The material development of this State has been still more rapid than its increase of population. The assessors' returns for 1879 report 8,840,282 acres of plowed land; 5,758,415 acres in pastures; 5,101,441 in woodlands, out of a total of 25,376,284 acres of taxable lands enumerated in the Grand Duplicate of the State for the same year. Of these, according to the report of the United States Agricultural Bureau for 1879, 3,019,600 acres were in Indian corn, an increase of over thirty-seven per cent. in ten years; 1,876,500 acres were in wheat, an increase of more than forty-two per cent. in ten years. There were 67,400 acres planted in rye; 860,100 in oats; 38,500 in barley; 16,100 in buckwheat; 124,400 in potatoes (an increase of 45 per cent.); 21,000 acres in tobacco; and 2,099,145 in hay, an increase of more than fifty-one per cent. To overcome as much as possible the fluctuations of seasons and markets, and so furnish to agriculturists, capitalists, social and political economists, and all concerned in definite knowledge of this subject, a safe basis for their calculations, so far as Ohio is concerned, I have with much labor averaged the yields and values of the principal crops of this State for the five years ending with 1879. This table exhibits not only the total average annual yield of each of these crops for the period named, and its total value, but the price per

bushel, pound or ton, and the yield per acre, together with the value of the yield per acre—each averaged for five years. In the first column I am able to set forth the total of four of the principal of these crops for the year 1839, indicating that in forty years the corn crop has increased 209 per cent.; the wheat crop, 60; the oat crop, 88, and the hay crop, 124 per cent.

Crops.	Total yield of crop of 1839, in bushels, pounds or tons.	Average annual yield in bushels, pounds or tons for 5 yrs. ending 1879.	Average price per bushel, pound or ton for 5 years.	Average annual value of crop for 5 years ending with 1879.	Average annual yield per acre, for 5 years ending 1879.	Average annual value per acre for 5 years ending 1879.
Indian corn.	33,668,147	104,265,940	$0.38+	$40,278,992	34.3	$13.37
Wheat.....	16,171,661	26,992,350	1.08	25,700,660	14.7	16.25
Rye.....	.....	731,792	.65+	457,799	14.6	9.44
Oats.....	14,893,103	27,063,098	.29+	7,813,353	30.5	8.76
Barley.....	.....	880,120	.74+	681,087	24.5	18.15
Buckwheat..	.....	339,540	.74	249,544	14.7	10.07
Potatoes....	.....	10,406,640	.46+	4,735,463	88	87.77
Tobacco....	.....	19,199,750	.05.9	1,128,340	748 lbs.	43.37
Hay.....	1,022,037	2,287,616	9.32	2,066,312	1.24 T.	11.52
				$83,126,550		

The total cereal product of Ohio in 1879 was 170,811,300 bushels, on 5,878,200 acres; an average of 29 bushels to the acre. The total cereal product of France, in 1875, was 216,805,223 hectolitres, on 14,916,328 hectares; and the average yield to the hectare was 14.35 hectolitres, or 16.46 bushels to the acre.

The cereal crops of Ohio in 1859, 1869, and 1879, in bushels, according to the Census tables of 1860, 1870, and 1880, were:

Crops.	1860.	1870.	1880.
Wheat.....	15,119,047	27,883,159	46,014,869
Rye.....	683,686	846,890	389,231
Oats.....	15,409,234	25,847,549	28,664,505
Indian corn.....	73,543,190	67,501,144	111,877,124
Buckwheat.....	2,370,650	180,841	280,239
Barley.....	1,663,868	1,715,231	1,707,129
Totals.....	108,789,675	123,473,804	188,933,177

In 1879, according to State statistics, in addition to a hay crop of 2,456,000 tons, of which 1,951,000 were timothy, Ohio produced 388,200 bushels of timothy seed, worth $980,000. In 1868 it produced 479,669 bushels of flax-seed, and 12,036,083 pounds of fibre, off an area of 148,986 acres; also 11,909 pounds

of sorghum sugar and 1,973,048 gallons of syrup, from 16,805 acres. Its sugar maples yielded 2,978,288 pounds of sugar, and 510,117 gallons of syrup, and its apiaries contained 169,755 hives, yielding 2,512,293 pounds of honey. In the same year, its orchards covered 421,349 acres, yielding 30,669,404 bushels of apples (the largest yield in the history of the State); 1,476,159 bushels of peaches (a light crop); and 110,419 bushels of pears. Besides this, there were considerable orchards of plums and cherries. In the same season the Ohio vineyards had increased from 8,560 acres the year before, to 9,963 acres, a gain of more than sixteen per cent.; and they yielded 10,341,715 pounds of grapes and 708,733 gallons of wine. Immense quantities of small fruits and vegetables are raised every year, of which no regular returns are made to the State statisticians. It appears that not less than 80,000 bushels of strawberries were handled in Cincinnati, in 1879. These brought from $1.25 to $3 per bushel. The total product of the State has been estimated at 400,000 bushels of strawberries, worth $800,000. Andersonville township, Hamilton county, produces the greater part of all the berries sent to Cincinnati. The value of the berries and tomatoes of the entire State is roughly estimated at $2,400,000 per annum.

The live cattle and meat products of this country not only supply a per capita home consumption nearly double that of any other nation, but have of late years taken a prominent place among our exports to foreign lands, the total number of living animals exported from the United States for the year ending June 30, 1879, being 435,597, against 82,274 in 1870, of the value of $11,487,754, against $1,048,039 in 1870; while the meats exported during 1879 amounted to $90,614,985 in value; the butter, cheese, and condensed milk, to $18,121,056; and the tallow, hides and wool, to $12,089,071. In the year ending June 30, 1880, the value of live animals exported increased to $15,882,120, a gain of over thirty-eight per cent.

That, directly and indirectly, Ohio contributed a considerable share of this surplus, is made very evident by the statistics of farm animals and dairy products, given in this chapter and elsewhere in this volume.

The following table shows the number of farm animals in Ohio, averaged for five years, with the price per head and their annual total value, averaged for the same period:

Farm Animals.	Number in February, 1870.	Annual number of animals averaged for 5 yrs. ending Jan. 1880.	Price per head, averaged for the 5 yrs. ending 1880.	Total annual value, averaged for 5 years.
Horses	724,200	771,960	$61.59	$47,494,705
Mules	26,000	26,300	64.54	1,698,594
Oxen and other cattle	752,000	799,320	23.24	18,600,592
Milch cows	815,000	726,140	30.95	22,016,950
Sheep	3,340,000	4,070,000	2.65	10,817,165
Hogs	462,000	1,983,900	5.97	11,404,453
Totals	5,619,200	8,378,120		$112,032,459

During the ten years closing with 1878, the dairy products of Ohio have grown surprisingly, having increased from 37,605,378 pounds of butter in 1868, to 50,332,000 pounds in 1878, and from 17,814,597 pounds of cheese to 36,401,386 pounds, making the total dairy product of 1878 worth not less than $11,200,000. Much of this increase is due to the introduction of the factory system of manufacturing butter and cheese, which has resulted in improving the quality as well as multiplying the quantity of these articles, enabling them to compete with the best dairy products of the Eastern States and Europe. The milk sold in 1870 amounted to 22,275,344 gallons, and in 1880 to 51,950,620 gallons. The poultry and eggs of Ohio constitute no mean element in its schedule of products, amounting in 1880 to $4,590,000.

The wool produced in 1878 amounted to 16,390,505 pounds, worth in New York $4,590,000, which places Ohio in the front rank of wool-producing States. Only California and Texas surpass Ohio in the number of sheep raised, and only California in the quantity and value of wool produced. In 1879, Ohio had over two and a half times as many sheep as any other Western State. The superiority of American wools in soundness, strength and length of staple, adds greatly to their value in the markets of the world, and gives our manufacturers an advantage over those of most other countries, which is beginning to be appreciated both at home and abroad, as plainly manifested by the increased demand for American woolen goods. In these elements of excellence the Ohio wools stand among the first. It is hard for the political economist to discover any real value in dogs; yet the State records report 272,084 of these animals, valued by their owners at $373,624. That "the meat of the children is given to the dogs," not only at the poor man's table, but in the sheep pastures, is demonstrated by the assessor's returns for

1879, which bear witness against the curs, that they killed not less than 24,684 sheep, and injured 22,942 during that year—the aggregate damage amounting to $104,444. Diseases, which carried off in the same period 228,015 hogs, valued at $661,454; 63,702 sheep, valued at $153,485; 14,795 cattle, worth $363,172; and 11,109 horses, valued at $603,735, impose quite as heavy charges upon the farmer as he can complacently bear, without this aggravating infliction suffered from an army of useless whelps. Stringent laws and dog poison, still more effective, have worked some abatement of this plague since 1871, when the damage to sheep-husbandry from dogs amounted to nearly eighty per cent. more than in 1879; but it is evident that this evil is still a serious one to this industry.

The best of light and brown sandstone, and other excellent building materials enter largely into the buildings of the State, and large quantities of similar materials are exported. The importance of the home demand may be better understood by the fact that nearly 12,000 new buildings are annually erected in Ohio at a cost of nearly $7,000,000. Beds of gypsum and marl add not a little to the wealth of the State, as fertilizers and in commerce; and underlying the beds of iron ore in the southeastern portion are extensive quarries of buhrstone, the only ones of any considerable value as yet developed in the United States, constituting our chief substitute for the famous buhrstone of Paris for milling purposes. About one-third of Ohio, as I have already shown, is underlaid with the Coal measures, the lower strata of which contain immense beds of bituminous coal, iron ore, limestone, and the buhrstone of which mention has already been made above. Seldom is nature so bountiful in her gifts as she has been to this section of Ohio. While Ceres gilds the undulating fields with yellow harvests and Pan leads the myriad flocks among the hills and meadows above ground, Plutonian riches of even greater value are found stored away in inexhaustible mines beneath. The coal beds vary from two to ten feet in thickness, and embrace an area of not less than 10,000 square miles. The coal product of 1878, according to the assessor's returns of May, 1879, was 5,245,077 tons—more than forty per cent. of the total yield of the Western States—and the mines employed 9,952 persons. The largest yield was obtained in Tuscarawas county, 35,059,607 bushels; the next largest in Trumbull county, 26,618,843; the next in

Stark, 2,339,404; these together being nearly fifty per cent. of the whole. The yield for 1880 is estimated by the State Inspector at 7,000,000 tons. As yet but an insignificant portion of the coal fields has been opened up. The iron ore mined in the same year was 291,847 tons, of which 83,654 tons were taken from the Lawrence county mines; 77,500 from Columbiana; 61,333 from Perry and 25,296 from Jackson county, leaving but fifteen per cent. for the five other iron-producing counties. These mines gave employment to 1,655 persons. As yet the iron mining in Ohio is scarcely more than begun. There is probably more black band iron ore in this State than in all the rest of the Union.

The petroleum yield for the same year was 1,272,723 gallons, of which 2,000,000 refined petroleum were obtained from Coshocton county, and 42,000 in Ottawa county; while 955,000 gallons of crude oil were produced in Washington, and 218,723 gallons in Morgan county. Salt springs are numerous in the Muskingum valley and between this and the Ohio river. In some cases inflammable gas issues from them, and burning wells are not uncommon. The salt-bearing rock is usually found at from 650 to 750 feet below water level in the rivers. The product of the salt furnaces in 1879 was 2,903,961 bushels; of which the Meigs county furnaces made 1,895,354 bushels; or two-thirds of the whole; Muskingum county 603,750, and Tuscarawas county 176,427 bushels. Large beds of potter's clay of good quality exist in several parts of the State, and the stone-ware made in 1879 amounted to 5,354,200 gallons, of which Summit county manufactured 3,540,000, or fully two thirds of the whole. Columbiana, Defiance, and Highland counties manufactured 32,166 barrels of water cement; and Greene county made 108,250 barrels; Clarke, 102,000; Erie, 80,000; Sandusky, 78,000; Cuyahoga, 73,574, and twenty other counties together, 101,000 barrels of lime, being a total of 532,826. Considerable quantities of fire-clay are manufactured.

It is one of the peculiar advantages enjoyed by Eastern Ohio, that the coal, limestone, and other essentials for the reduction of iron ores, and the iron itself, are all found in close proximity; whereas the ores of other regions have, in many cases, to be transported over long distances to reach coal beds and the required fluxes. Ohio has heretofore taken high rank among the iron-manufacturing States, standing second to Pennsylvania

in its iron product in 1880; the total production of iron as returned by the tenth census, being 930,141 net tons. The State has 184 blast furnaces, rolling mills, steel works, etc., in which $25,141,294 of capital is invested, 20,071 hands employed, $8,965,070 wages paid, $23,997,915 materials used, nearly $35,000,000 worth of manufactured articles produced, weighing, as above said, 930,141 tons, against 449,768 tons in 1870. In 1878 the hot blast furnaces of Ohio turned out 268,567 tons of pig iron, of which the Mahoning county furnaces yielded 81,403 tons; the Cuyahoga furnaces the next largest amount—60,000 tons—Jackson, 31,616 tons; Perry, 26,003 tons; and Lawrence, 16,174 tons; which distinctly outlines the *locale* of the iron and steel smelting business. The iron-manufacturing centre of the State is indisputably Cleveland; Cuyahoga county alone producing 168,165 tons of pig and rolled iron, and 25,000 tons of castings, or thirty-five per cent. of the whole. In foundry products, Cincinnati and the rest of Hamilton county take the first rank, with a total of 31,600 tons of stoves, hollow-ware, and other castings. The foundry productions of the entire State, reported by the assessors, May 1, 1879, was 27,386 tons of stoves and hollow-ware; 22,450 tons of car wheels; and 27,118 tons of other castings; total, 76,954 tons, which, added to the pig metal and rolled iron before given, made an aggregate of 621,925 tons of iron and steel products for that year, besides twenty-five locomotives, 1,502 steam engines, 1,035 steam boilers, 109 sugar mills, 29,828 reapers, 24,950 mowers, 2,089 threshing machines, 22,776 plows, 2,500 corn planters, and large quantities of implements for mechanical and agricultural purposes. But I have shown that this business was exceeded in 1880.

The total value of the manufactures of Ohio, in 1880, was about $460,000,000. Of this amount some thirty per cent. was produced in Hamilton county, which includes Cincinnati. Cleveland and the remainder of Cuyahoga county made nearly an eighth of the whole. Montgomery county, embracing Dayton; Summit, embracing Akron; Stark, with its busy towns of Canton, Massillon and Alliance; Franklin, with the active city of Columbus; Lucas, including Toledo; Mahoning, with the furnaces and mills of Youngstown; Butler, including Hamilton; and Trumbull, embracing Warren—followed the two leading counties above named in the list of Ohio's manufacturing localities, in about the order above given, with a product of from

$20,000,000 down to $8,000,000 each. Clark, Jefferson, Lawrence, Scioto, Richland and Muskingum counties stood next, with products amounting to about $7,000,000 apiece in the chief of these, and not less than $4,500,000 in the least. Twelve other counties, in various parts of the State, made, in 1880, from $2,000,000 to $5,000,000 worth of wares each. With the map of Ohio before him, and the above indications of the chief manufacturing counties, one readily comprehends that no single portion or district of this great State monopolizes its manufacturing industries. The glare of the blast furnace is seen and and the thunder of the forge is heard in many a noisy industrial neighborhood, and the whirr of wheels and buzz of saws and spindles salute the ear throughout every portion of the commonwealth.

Among these it is not difficult to designate the chief industries except in a few instances, where two or more classes of manufactures are so nearly balanced in the aggregate values of their several products that only the final statistics of the Census Bureau, not yet available, will enable us to determine which predominates. In Ohio, probably, the iron and steel production exceeds the value of the flouring and grist mill products. If so, then this is the only one of the ten prairie States in which flour and meal do not outrank in value every other manufacture. Clothing, lumber and wooden ware, agricultural implements and machinery, distilled, malt and vinous liquors, packed meats, furniture, leather, coal-oil rectified, boots and shoes, tobacco in various forms, carpentry and building, ranked next in importance to the two leading lines of manufactures. The value of these classes of products ranged from about $35,000,000 each, in the case of the iron and steel, and the flour and meal, down through the twenties and tens of millions to about $6,000,000 each in the ones last named. Next in value stood carriages and wagons, printing and publishing, paper, cooperage, butter and cheese, woolen goods, stone and earthenware, sash and doors, and freight and passenger cars, ranging in aggregate value from $6,000,000 down to $2,500,000 each. Hamilton manufactures nearly four times as much lumber, planed and sawed, as any other county; then follow Lucas, Hardin, Cuyahoga, Trumbull, Erie, Ottawa, Van Wert, Sandusky, Wood, Stark, Ashtabula, Wayne, Darke, Henry, and Champaign. Butler county is the centre of paper manufacture, and Cuyahoga stands next to it

in the total value of paper of all descriptions produced in the county.

In meat packing and clothing, Hamilton county so far exceeds any other in the State that comparison is useless. In bridge building Cuyahoga leads the State, and in cooperage it is far ahead of all rivals, exceeding even Hamilton by nearly 100 per cent. Glass manufacture is one of the growing industries, Ohio standing now fifth among the States in the amount of window glass made, third in glassware, and seventh in green glass. According to the report of Professor G. Brown Goode, special agent in charge of the Fishery Division of the Census, Ohio stood first among the States in the number of pounds of lake fish caught in 1880, first in the number of pounds of such fish salted, and only second to Michigan in the value of fish, fresh and salted. More than half of this industry is centered in Erie county and mainly at Sandusky. Lucas county stands next, with nearly a fourth of the entire business.

It is quite surprising that Ohio has not gone into the manufacture of cotton more extensively. With excellent water-power, and such abundance of cheap fuel at home, while the cotton region stretches to her very border, it seems strange that in 1880 there were but forty-two looms and 14,328 spindles in this State, consuming 10,597 bales of cotton, and employing only 563 persons. The attention given to woolen manufacturing is much more considerable, the product in 1880 amounting, it is estimated, to over $4,000,000 in value. There is good reason to anticipate a rapid increase both in the woolen and cotton manufactures of Ohio. Already this State ranks with the very first in the total value of its factory products.

A carefully prepared estimate made from the returns sent in from the commercial agencies, for 1880, would indicate that there are 26,525 reputable commercial houses in Ohio, and that the total wealth of these establishments is $192,275,409; that there are 7,353 traders or operatives, with a capital each of $500. There are probably 5,317 *bona fide* manufacturing firms, with a total wealth of $75,661,958, and upward of 250 manufacturing corporations, with a total wealth of $26,787,422. If these figures may be relied upon, the total commercial and manufacturing interests of the State would now represent a wealth of $296,804,951.

No stronger confirmation of the avowal of the Superintendent

of the Census that the statistics of the Mining and Fishery Industries in the United States, down to and including the Census of 1870, are "distressingly inadequate to the known facts of the case," could be adduced than the returns made for Ohio and other States bordering on the Western lakes and rivers. According to this, the fisheries of Ohio, in 1870, employed only 565 persons, receiving $71,782 wages, engaged $262,000 capital; and produced $383,121. The fish taken on the lake shore alone were worth fully this sum.

The following statistics are founded on preliminary reports made to the Census Bureau. The final reports, the aggregates of which for each of the ten Prairie States are given in Chapter I., differ somewhat from these figures:

ESTIMATE OF THE VALUE OF THE YIELD OF THE LAKE FISHERIES OF OHIO FOR 1879.

Toledo	$ 90,000.00	Brownhelm Bay to Lorain	$ 10,886.00
Locust Pt.	2,725.00	Dover Bay	7,408.00
Toussaint	1,800 00	Ashtabula and Conneaut	20,900.00
Port Clinton	28,900.26	Willoughby & Painesville	13,945.00
Huron	21,914.07	Miles Grove	7,900.00
Sandusky	186,891.51		
Vermillion	10,129.16	Total value	$400,979.00

With the attention now given to fish culture by the general government, the State, and private parties, this industry may be expected to develop greatly during the decennial period now opening.

Powerfully conducive to all this wonderful growth of Ohio in population, agriculture, and the great industries, as I have intimated before, have been its systems of transportation, without which, it is safe to presume, such a growth in such a brief period of time would have been impossible. Nature had done grandly for Ohio, giving her a coast line of 230 miles on Lake Erie, and 436 miles on the Ohio. Yet, in early days, to reach the Eastern markets, swine and cattle had to be driven over the Alleghanies and the Blue Ridge to Baltimore or Philadelphia*—a wearing journey of from six weeks to two months. So impressed was Congress with the hardships of this journey and the necessity of constructing roads, that one of its first acts after the adoption of the present constitution was to provide for the construction of the National Road, to run from Cumberland, Maryland,

* The Ohio Gazetteer for 1811 says that 40,000 head of swine were driven from Ohio to Philadelphia and Baltimore and other Eastern markets, in 1810. Vast numbers of swine were also driven to Detroit and other military posts in that quarter.

through Ohio, Indiana, and Illinois, to the Mississippi—a road eighty feet wide and nearly 1,000 miles long, which was looked upon for many years as the Appian Way of this country. When Ohio was admitted to the Union, it was stipulated that the State should expend a given per cent. of the amount received for certain lands granted to it, for the construction and maintenance of roads. There are to-day 478 turnpikes and plank-roads, public and corporate, in this State, with a total length of 3,728 miles.

According to the late Judge Burnet, of Cincinnati, the first company of Ohio pioneers, under the lead of General Rufus Putnam, of Connecticut, struck the Monongahela river near the mouth of the Youghiogheny, and, as it was not safe to proceed in open boats, they built a substantial row-galley, completely decked over, as a protection against Indians. "This," he adds, "was the first decked vessel that ever floated the Ohio." This was the germ, in 1788, of a business on the Western rivers, which, according to the government report for June 30, 1879, had then expanded to 1,203 steam vessels, and 1,373 barges, with a measurement of 501,809 tons. This is without taking into account sailing vessels on the Lower Mississippi, and canal boats within the waters of Ohio and other Western States. On the Lakes, in the same year, there were 3,087 American vessels, with a measurement of 507,376 tons, besides an immense fleet of foreign vessels. To the river and lake navigation must be added the 736 miles of canals constructed within Ohio, and owned by the State—connecting the Ohio river and Lake Erie by a line from Portsmouth to Cleveland, and by another line from Cincinnati to Sandusky, thus uniting the 1,500 miles of navigable waters of the St. Lawrence river with the nearly 20,000 miles of navigable waters of the Mississippi system. The last-mentioned line connects with the Wabash and Erie canal, a few miles north of Defiance, which, until the abandonment of its upper section, joined the navigable waters of the Wabash river and Lake Erie, and linked together the canal systems of Ohio and Indiana.

The proportion of these vessels enrolled or licensed in the three customs districts of Ohio on Lake Erie, and the customs district of Cincinnati, their value and the number of hands employed, may be seen in the following tables, compiled from reports prepared for the Tenth Census:

VESSELS BELONGING OR ENROLLED AT THE SEVERAL CUSTOM-HOUSES OF OHIO ON LAKE ERIE.

Class.	No.	Tonnage.	Value.	Crew.
Passenger steamers	6	2,680.38	$ 99,200	91
Freight "	85	81,767.97	1,618,100	468
Towing "	85	1,800.51	124,100	129
Yachts "	24	282.81	187,200	81
Totals	110	86,931.69	$2,027,700	867

OHIO RIVER STEAMERS.

Class.	No.	Tonnage.	Value.	Crew.
Passenger steamers	78	24,671.10	$1,524,500	1,909
Ferry "	17	286.45	22,200	28
Towing "	29	8,621.87	144,200	265
Totals	118	33,571.42	$1,718,400	1,900
Canal boats, estimated	250	25,000	$150,000	1,400
Barges, "	300	90,000	115,000	.....
Wharf boats, "	28	10,000	30,000	.....

ORE AND GRAIN TRAFFIC OF OHIO ON LAKE ERIE—[illegible].

Traffic.	No.	Tonnage.	Value.	Ore to Ohio Ports.
Ore trade	24	26,550.22	$1,000,000	1,070,040 tons.
Grain "	6	3,594.73	200,000	.....

Important as are all its means of water transportation, the railroad system of Ohio is of far greater service to it. The railroads (begun with the construction of the Cincinnati & Sandusky railway, in 1836, and the Cincinnati & Cleveland, commenced in 1843) have expanded to 6,021 miles within the State, uniting the commerce of Ohio to all the great trunk lines of the Union. The increase, within the State alone, during the decade from 1870 to 1880, has been more than eighty-three per cent. Down to 1879 these railroads had cost $423,745,324; their gross earnings that year amounted to $52,490,430, their net earnings to $19,940,511, and they paid out $7,047,536 in dividends. The capacity of these mighty channels of commerce is but dimly outlined by the fact that the returns of the Ohio roads alone report 1,804 locomotives, 1,221 passenger and baggage cars, and 46,990 freight cars, moving upon eighty-five

roads; of which thirty-seven carried 18,634,622 passengers and 1,709,996,944 tons of freight in the single year 1879.

There are over fifty cities in the State with a population of 5,000 and upwards—of which Cincinnati has 255,708 inhabitants; Cleveland, 160,142; Toledo, 50,143; Dayton, 38,677; Columbus, 51,665; Zanesville, 18,120; Springfield, 20,729; and seven others, over 10,000. The trade and manufactures of these hives of human industry are treated of elsewhere. All these cities are linked together by an endless chain of railways and the perpetually rolling wheels of a sleepless commerce.

To facilitate exchanges and serve as the nerve centres of this magnificent commerce, there are 165 national banks in Ohio, with a capital of $26,960,061; nineteen corporate banks, with a capital of $1,312,842; twenty-seven savings banks, with a capital of $1,575,361; and 173 private banks, with $4,407,794 capital, or a total of 384 banks, with $33,256,078 capital.

The extent of the mercantile business of this State is indicated by the following carefully prepared summary of the insurance business in Ohio for the year ending January, 1880:

Companies.	Risks written.	Premiums received.	Losses incurred.
Ohio joint stock fire and fire-marine insurance companies	$ 57,777,498.61	$1,022,147.28	$ 562,232.43
Ohio mutual fire ins. companies	53,140,206.35	385,338.91	419,950.83
Joint-stock fire and fire-marine ins. companies of other States	155,075,756.79	1,541,209.44	706,635.85
Mutual fire and fire-marine ins. of other States	7,075,015.02	79,236.36	66,542.72
Marine insurance companies	2,893,000.00	10,831.29	3,500.00
Foreign insurance companies	47,319,523.74	466,473.63	169,966.23
Casualty ins. co's of other States	9,767,297.35	43,423.19	49,419.34
Total ins. other than life	$303,993,549.84	$3,610,694.15	$2,008,248.50
Ohio life insurance companies	992,049.00	306,532.50	93,725.00
Life ins. co's of other States	9,248,540.00	3,596,697.34	1,914,770.00
Total life insurance	$10,220,589.00	$3,905,410.84	$1,278,495.00
Aggregate	$313,194,138.84	$3,516,104.99	$3,286,743.50

The total assessed value of real estate in Ohio, according to the Census report of 1880, is $1,102,677,704. From the returns on 600 special schedules sent into every county of the State, it appears that real estate is assessed differently in different counties, varying from thirty-three and one-third to ninety per cent. A careful analysis of these returns makes it fair to estimate, that,

on an average, real estate is assessed at about sixty per cent. in Ohio; hence the true value of all its real estate is, $1,667,792,640. It is difficult to make even an approximation of the true value of personal property. The assessors' books show $443,000,000, but this does not cover one-half of the personal property of the State, which careful computation shows to be, in round figures, $1,000,000,000, making a total true value of $2,887,792,640, or of $887.29 per capita of the population, while the debt is only $15.98 per capita.

In the recent investigation made by the Wealth, Debt, and Taxation division of the Tenth Census into the ownership of the national debt, it was found that private citizens in Ohio held $16,445,050 of the registered bonds; and, estimating at the same ratio, the State owns $18,988,696 of coupon bonds. The registered bonds are distributed in the following cities:

Large Cities.	Total amount of Registered Bonds.
Cincinnati	$ 4,815,450
Cleveland	3,694,200
Columbus	868,100
Dayton	584,650
Toledo	344,200
Zanesville	304,100
Balance of State	1,834,350
Total	$16,445,050
Total amount of coupon bonds held in State	18,988,696
Total	$35,433,746

The State debt of Ohio, which was nearly $13,000,000 in 1841, and upwards of $15,000,000 in 1862, has gradually decreased to $6,472,640, of which all but $4,165 bears interest at six per cent. Of this grand total, the irreducible debt, belonging to the public school fund and the agricultural college fund, aggregated $4,289,718. Below is the debt exhibit of the State according to the Census of 1880:

Total State debt	$ 6,472,640
Total county debt	2,922,647
Total city debt (cities over 7,500 population)	20,571,260
Total debt of other cities and towns	1,028,024
Total school district debt	1,451,177
Total	$32,395,747

The taxation for general and school purposes for 1880 may be divided as follows:

Taxation for General Purposes.		Taxation for School Purposes.	
State	$2,914,849	State	$1,533,945
County	7,084,668	Cities (over 7,500 inhabitants)	1,696,576
Cities	8,783,516	Other cities and towns	3,731,530
Total	$18,781,916	Total	$6,964,050

Thus the taxation—State, county, and municipal—for all purposes, aggregates $25,785,961 annually, or 8.04 per capita of the population. It is in brief:

Debt per capita of population	$ 15.98
Taxation per capita of population	8.04
True value of property per capita of population	887.29
Taxable property per capita of population	466.31

Below is a very interesting table, compiled with great care, exhibiting the population of the fifteen largest cities of Ohio; the total assessed valuation of property, the per capita valuation; the total taxation, the per capita taxation; the total debt, and the per capita debt:

Cities.	Popul'n 1880.	Total Assessed Value Property.	Per Capita Ass'd Val.	Total Tax Levy.	Per Capita Levy.	Total Debt.	Per Capita Debt.
Akron	16,512	$ 7,800,000	$449.10	$ 164,714	$ 9.97	$ 23,000	$ 1.39
Canton	12,258	5,056,070	413.47	108,201	8.82	180,657	14.78
Chillicothe	16,988	4,981,634	291.15	89,449	5.28	.....	.....
Cincinnati	255,708	166,697,294	650.90	4,906,477	19.17	24,403,500	95.48
Cleveland	160,142	70,348,104	440.59	1,791,922	11.18	6,344,881	39.63
Columbus	51,665	27,489,389	531.10	581,715	11.25	1,259,163	24.37
Dayton	38,677	18,888,270	488.35	421,900	10.80	1,110,240	28.70
Hamilton	19,128	5,986,750	429.75	149,472	11.75	48,067	3.95
Portsmouth	11,814	5,446,918	461.53	134,266	11.36	394,700	33.69
Sandusky	15,838	4,041,913	255.20	156,695	9.88	480,100	30.38
Springfield	20,730	9,683,750	467.15	188,978	8.87	64,900	3.13
Steubenville	12,093	5,173,520	427.82	77,601	6.41	35,898	2.96
Toledo	50,142	18,807,955	372.69	612,695	12.21	3,374,246	67.29
Youngstown	15,431	4,437,648	287.52	103,841	6.72	203,050	13.15
Zanesville	16,120	7,400,000	408.88	167,887	9.33	534,549	29.50
Totals	707,690	$361,669,207	$511.08	$9,642,348	$13.62	$40,396,084	$57.08

These fifteen cities in the State of Ohio aggregate 707,690 inhabitants, or twenty-two per cent. of the population of the State. The total assessed value of property in these cities is $361,669,207. The true value, judging from the incomplete returns received up to this time in the Census Office, would be nearly double that amount, or $739,338,214. The average per

capita wealth seems to be greater in Cincinnati, where it is nearly $651, than in any other city. It is surprising, however, to observe how evenly the per capita valuation runs in the cities of this State, nearly nine out of fifteen being over $400, and under $500; the average being about $511 per capita of the population, or, if we choose to take the true value, $1,022. The total tax levy for various purposes made during the fiscal year closing in 1880, aggregates $9,642,348; but the per capita taxation shows a greater degree of variation than does the per capita wealth. For instance, in Chillicothe, it is down as low as $5.28; and in Cincinnati it runs as high as $19.17, making an average per capita taxation for the large cities of the State of $13.02.

Of course, we find within these cities the bulk of the local debt, aggregating $40,300,034, and the variation in the per capita is still greater than in the taxation column; for here we find the little city of Akron down as low as $1.30 per capita, while the city of Cincinnati exhibits a gloomy pre-eminence in a per capita debt of $95.43. Toledo is the next most deeply involved, $67.29; Cleveland, third; Sandusky, fourth, and so on. The average debt per capita of all these cities is $37.08. Quite a contrast this to the rural districts, for, when the vast population from the small cities, towns, and villages of the country is brought in, we find that the per capita debt of the entire State is $15.98.

While the energies of this people have been so intently directed to the material development of their State, they have not failed to respond to the claims of man's higher nature. Education in all its forms, from the unsectarian instruction of the common schools, free to the children of rich and poor without distinction of race or color, to the higher culture of colleges and professional schools, and the moral and religious teachings of the churches, is amply provided for. When the State government was organized, it claimed and received from the general government the sixteenth section in every township, or its equivalent, for public school purposes. On Nov. 15, 1879, the common school fund of the State amounted to $3,744,603.85, and the funds of the agricultural college and the two State universities, to $545,114.67—a total of $4,289,718.52, producing an income of $274,059.42. The same year the State tax for the common school fund was $1,035,744.50, and the local taxes for school purposes

were $5,418,104.20. Other funds, fines, licenses, etc., and the balances brought over from the preceding year, swelled the total receipts of the school treasurers to $11,242,210.36, and the expenditures were $7,711,395.24. There were 12,143 school houses in the State, valued, including grounds, at $21,102,255. Of the 1,948,330 persons between six and twenty-one years of age, 734,651 were enrolled in the schools; the sessions of which averaged thirty weeks to the year.

For the preparation of teachers for their work, there are ten normal schools, only two of which, however, receive any State or municipal support. A fund has been provided for the aid of teachers' institutes, by taxing the candidates for teachers' certificates.

There are thirty-five colleges and universities in Ohio, of which five are non-sectarian. All the others are under denominational control. In 1879 thirty-three of these institutions reported 289 instructors and 6,240 students. Thirty of them reported 380 graduates. Twenty-one academies reported 131 regular instructors and 4,369 students in 1878; and eleven female colleges and seminaries reported 112 instructors and 907 students in 1879.

Besides the above, there are four scientific schools. Of these, the Ohio Agricultural and Mechanical College at Columbus, controlled by the State and endowed by congressional land grants, has buildings, grounds, and apparatus estimated at $300,000. It has an endowment of 700,000, producing an income of $30,500, and a library containing 1,000 volumes. There are fourteen theological schools, with fifty-eight instructors and seventeen endowed chairs, and with 351 students, and 97 graduates (in 1879). There are two law schools, with 120 students, twenty-nine graduates (1877), and 109 volumes in libraries. There are ten medical colleges, one dental college, and one college of pharmacy in the State, having 136 instructors and lecturers, 1,565 students, and 550 graduates (in 1877).

That essential element of everything American, the never-missing factor in all of our prosperity, the press, was established in Ohio at the very outset of the State's history. In 1880 every one of its counties had one or more newspapers. There are, in all 666 papers in the State, of which 54 are published daily, 6 tri-weekly, 4 semi-weekly, 518 weekly, 3 bi-weekly, 10 semi-monthly, 65 monthly, 7 bi-monthly, and 5 quarterly. The fifty-four daily papers issue 65,890,329 copies annually, besides

17,121,740 copies in their semi-weekly, weekly, and other editions. The leading papers of Cincinnati take rank with the most powerful organs of the American press, and the chief papers of Cleveland, the capital, and several other Ohio cities, are widely known and influential, particularly within the State itself.

In this State the year 1880 closed upon a population of nearly three and a quarter millions, with scarcely one member unemployed, unless from choice, or because of mental or physical disability. For these unfortunates, the benevolence of the people has made ample provisions of excellent character in State institutions for the blind, the deaf and dumb, the sick, the feeble-minded, and the insane.

Among the infallible criteria of a prosperous, moral, and well-governed State, are a high ratio of marriages, a low ratio of divorces and illegitimate births, and a low ratio of paupers and criminals, and herein the records of Ohio are very creditable. The marriages in 1879 numbered 26,399, or one in twenty-eight of the male population above twenty-one years of age. The births numbered 65,132, of which only about two in a thousand were illegitimate, whereas in France the ratio of illegitimate births in 1877 was over sixty-one in a thousand. The total number of divorces granted was 1,472, of which about twenty-five per cent. were for adultery, twenty-five per cent. for cruelty, and fifty per cent. for lighter offenses. The total number of boys sent to the reform school was 310; of girls, 73. There were 7,872 paupers in the infirmary, and 23,823 paupers otherwise supported for a portion of the year. The total number of convicts received at the penitentiary for the year 1879 was 631, or less than 1 to 5,000 inhabitants, and of these, ninety per cent. were from twenty-five to forty-five years of age, and a large proportion were foreigners. The total number in the penitentiary was 1,362, about 1 to 2,450 of the entire population, whereas in Pennsylvania, the same year, the convicts numbered 1 to 1,328.

Thus has Ohio passed, in less than a century, from a waste of unbroken forests and bison-pastured prairies, to the condition of a populous, wealthy, intelligent, and highly moral community; favored far above the communities of the old world in the enjoyment of civil liberty and the possession of all that good government and bountiful nature can vouchsafe to any people.

CHAPTER V.

STATE OF INDIANA.

Before attempting to sketch the Indiana of 1880, I open the musty covers of a rare old book of 1804, and, turning to "Northwestern Territory," read: "This portion of the United States is now divided into the States of Ohio, the Indiana Territory, and Wayne County, which forms a separate district and government. The northwest part of the above Territory, lying north of the Illinois river and between the Lakes and the Mississippi, is still inhabited by Indians, and is not included in either of the above divisions.* In some parts the country is too hilly for cultivation; and in some places between the Ohio and the lakes the land is so flat that the water stands till midsummer. For miles the ground is not visible, yet the water is not more than twelve or eighteen inches deep."

Such is the graphic description of the Northwest Territory given by that learned geographer "Jedidiah Morse, D. D., A. A. S., S. H. S., author of The American Universal Geography," in the American Gazetteer, one of the standard works of its time, Anno Domini 1804. To us, living only three-quarters of a century later, with the Census of 1880 before us, this seems a contracted and lugubrious description of a region that at this time contains five of the most prosperous, wealthy, and influential States in the Union, and no inconsiderable part of a sixth. Nobody will deny that Northern Indiana and several other sections of this extensive domain had some very moist places, such as the sloughs and lagoons along the Upper Kankakee, the flats near the headwaters of the White, the Wabash, the St. Mary, and the two St. Joseph rivers (some of which embraced whole townships), where for many years the chills and fever never failed to produce a large harvest, and corn and wheat, not being amphibious, often grew discouraged. Nevertheless, a decent

* The American Register (1804) says: "Wayne County, Indiana. A county of the Northwest Territory, laid out in 1796, now a Territorial jurisdiction, having 5,938 inhabitants."

respect for the water-nymphs and Jack-o'-Lantern compel me to remark that they did not selfishly appropriate anything like so large a proportion of the country as this learned geographer's description of the Northwest would give the outside world (then so ignorant of the West) to understand. Indeed, the swamp lands have proved to be a small fraction of the whole; and, as the country has opened up, and the natural drainage has been improved, a very considerable proportion of these wet lands has been reclaimed, as in time they are all likely to be. Indiana claimed all she could under the Swamp Act land grant, amounting to but 1,900,422 acres, not quite one-eighteenth part of the total area.

The northern extremity of Indiana lies in north latitude 41° 46′, and the southern in latitude 37° 47′. Its eastern boundary, the west line of the State of Ohio, is the meridian of 84° 50′ west of Greenwich, and its western limit—the eastern boundary of Illinois—is the meridian of Vincennes,* and the mid-channel of the Wabash river, from the point where this meridian crosses that stream, southwesterly, to its mouth. The Ohio river, separating it from Kentucky, forms its southern boundary; and at its northwestern corner it has a coast line of about fifty miles on Lake Michigan, including the harbor of Michigan City, its only lake port of entry. The extreme length of the State is 276 miles, its average length 244, its average breadth 140 miles. The area, exclusive of surface covered with water, is 33,809 square miles, or 21,637,760 acres; of which, not quite one-half, according to the assessors' returns of 1879, are reduced to culture. Total area, 36,350 square miles.

More than two-thirds of the surface of the State is level or gently undulating, frequently beautified with swelling knolls, or mounds, and occasionally by ridges rising from one hundred to three hundred feet above the general plain. It has been said that Indiana is peculiar in the absence of well-defined water-sheds. The tributaries of the several interior rivers interlock, and many of the lacustrine basins or swamps at the sources of the principal streams, particularly those in the northern part of the country, discharge their waters through two or more outlets

* In fact, owing to the imperfections of the government surveys, the eastern line of Indiana is not a true north line from the mouth of the Great Miami, nor is its western line, between the Wabash and Lake Michigan, the meridian of Vincennes, as prescribed by acts of Congress. This may account for some of the disagreements of State historians and encyclopedias in their statements as to the longitude of these boundaries, but it should hardly excuse the error of the American Encyclopædia in fixing the west line of Indiana in longitude 88° 9′—several miles east of Chicago.

lowing in widely diverging or opposite directions. The southern portion of the State grows more and more uneven as one approaches the Ohio river, until it becomes rugged, and in many places too broken and bare of soil for ordinary methods of cultivation. The assessors' returns show that much of this region is still in forests, barrens, or wild pastures. The bottom lands along the water-courses, however, are remarkably fertile, and some of them are very profitably cultivated The greatest elevations of Indiana do not exceed 670 feet above the Ohio river at the mouth of the Wabash. To the voyager along the Lower Wabash and Ohio, the hills, most of which are as high as the most elevated portions of the interior plateau of the State, seem almost mountainous, and in places the scenery wears an aspect of romantic beauty.

The principal rivers of Indiana are, the Ohio, which in several places almost doubles upon itself as it courses its sinuous way for 880 miles along the State's southeastern and southern limit; the Wabash, 600 miles in length, navigable for steamboats, in high water, for over 400 miles, and draining some 12,000 square miles; the White river and its tributaries, draining some 9,000 square miles; the Whitewater, flowing through the southeastern corner of the State; the Maumee, in the northeastern, and the St. Joseph, in the extreme northern, counties; the first discharging into the Great Miami, the second into Lake Erie at Toledo, and the last into Lake Michigan, at St. Joseph, Michigan.

The geological divisions of Indiana may be approximately defined by drawing a line from the northeast corner of Randolph county to Hanover Landing, not far below Madison on the Ohio: another line from Charleston on the Ohio northeasterly to Cassville, Porter county, and thence due northwest to the State line; another from the southern extremity of Harrison county to the southwestern angle of Lake; and a fourth line from about five miles east of Leavenworth, on the Ohio, to State line, Newton county. All west of the last line is a dark blue limestone, abounding in marine shells, and with heavy beds of blue clay, being the Trenton limestone of Hall, or Lower Silurian of Lyell. The division next east of this is sub-corniferous sandstone, of coarse structure and gray color. Next east of this is a soft, fine-grained sandstone of various colors, ranging through lead, gray, and yellow, to red, of the Chemung group. Between this and the narrow wedge of coarse granite sandstone interchanging

with beds of bituminous coal, fire clay, shales and coal measures, which makes all the southeastern corner of the State situated east of the first line drawn above, is an immense section embracing about half the area of Indiana, that belongs to the Niagara limestone, or Upper Silurian. In the most western of these five sections are the rich coal fields of this State, of which there are two well-defined zones, the eastern and western. The former contains the already noted non-caking variety of bituminous coal, called by the miners "block coal," which is remarkably free from sulphur and phosphorus, does not swell, send out jets of gas, nor cake in the furnace, and which is therefore peculiarly valuable for reducing ores.* This zone, averaging three to four miles in width, extends along the entire eastern border of the Indiana coal field, from Rome, in Perry county, northward to Williamsport, Warren county, a distance of 150 miles, covering an area of about 450 square miles, or 288,000 acres. The western zone, embracing all the State west and south of the block coal region, includes a little over 6,000 square miles. The beds of this belt produce only the caking variety of bituminous coals, which can not well be used for smelting purposes without coking. Near the eastern boundary of these coals, the beds vary from four to eight feet in thickness. Dr. Cox has given us a section of the Indiana coal measures, extending through 519 feet of drift hardpan, sandstone, fire clay, and shales, to the lowest coal, immediately below the millstone grit. Within this section there are eleven seams of coal, the lowest three feet thick; the next, two; the third (lower block), three feet eight inches; the fourth, five inches; the fifth, one foot five inches; the sixth ("main block"—the most valuable), four feet four inches; the seventh, seven inches; the eighth (upper block), one foot ten inches; the ninth (bituminous caking coal), seven feet; the tenth, ten inches; and the eleventh, four feet. Mr. James MacFarlane says: "As respects quality, quantity, and accessibility of its coal, Indiana is more fortunate than any of the other Western States." This is true except as regards quantity, in which Illinois leads Indiana.

* Professor R. T. Cox, the State Geologist, says, that for manufacturing pig iron this coal is not surpassed by any in this country; and Mr. James MacFarlane remarks: "As a blast-furnace coal to smelt iron ore, it has been amply tested in the five furnaces in Clay county, leaving nothing to be desired. The pig iron here made from Iron Mountain and Lake Superior iron ores by the use of block coal as a fuel, commands from two to three dollars more per ton at the furnace than the same grade of pig iron made in Kentucky and Ohio will command in Indianapolis."—*MacFarlane's Coal Regions of America*, p. 394.

Hon. John Collett, the State statistician, estimated the number of coal mines in operation in 1879 at 274, with a capital of $6,430,506; paying over five and a half millions of dollars wages to 2,307 employes, and producing coal valued at $25,000,000. Of this, about 90 per cent. was taken out of the four contiguous counties, Clay, Sullivan, Knox, and Daviess, lying between the forks of the White and the Wabash rivers. The same year, Mr. Collett estimated the number of stone quarries at 445, employing capital to the amount of $1,144,767, engaging 873 persons, and yielding products worth $1,488,618.

In the beginning of this century, Indiana, like Ohio, was for the most part covered with forests. Here and there, in the central and northern parts of the State, prairies and oak openings were found, and near the Illinois line considerable areas of prairie lands existed. Notwithstanding the enormous, and in many places wasteful, destruction of the forests, according to a recent estimate of the United States Agricultural Bureau,* 39.6 per cent. of the State is still in timber. This was nearly three times the amount of woodland in Illinois at the same date. Many of the Indiana forests are composed of trees of large size and good timber quality. Mr. C. R. Barnes, of Madison, Ind., writes, that, during the summer of 1873, in the prosecution of some botanical work in Southern Indiana, he was led to observe the size and character of the forest trees. He measured over 1,000 in Jefferson county, at three feet above the ground, with the following results:

Number of Trees of Each Species.	Average Diameter.	Average Height.	Number of Trees of Each Species.	Average Diameter.	Average Height.
400 beech trees	2 ft. 6 in.	65 feet	100 sugar maples*	2 ft. 6 in.	70 feet
100 red oaks	3 " 2 "	60 "	75 sycamores	4 " 9 "	85 "
150 white oaks	3 " 2 "	60 "	75 white elms	2 " 4 "	70 "
100 tulip trees	3 " 6 "	97 "	100 buckeyes	2 " 9 "	80 "

* 75 red maples averaged the same in diameter and height.

The above varieties and the white and blue ash, the chestnut, oak, and hickory, black walnut, poplar, and basswood, are found in nearly all parts of the State; and in the central and southern part, sassafras, sweet gum, mulberry, and cypress abound. The variety of trees found in this State is very large. Within its limits, the flora of the South meet, and interlock their branches with those of the North. The cypress, one of the principal

* Report of 1879.

lumber trees of Louisiana and Mississippi, grows to almost equal size in the wet bottom lands along the Wabash in Indiana and Illinois. The sweet gum of Tennessee and Kentucky is common in the Indiana woods; the pecan flourishes along the Wabash. These trees of the South are met by the hemlock of the Northern timber region. Going westward, Indiana is the last heavily timbered State within the parallels of 37° 40′ and 41° north latitude, which fact adds largely to the value of its forests; the products of which, in 1878–79, were estimated by the State statistician at $11,892,856 sawed lumber, and $4,539,804 staves, besides hewn timber, and large quantities used in wagon making, and the logs transported to other States to be cut into lumber or used as spiles.

The fauna of this State corresponds, for the most part, with those of Ohio and Illinois, mentioned elsewhere. Deer, squirrels, rabbits, the raccoon, and opossum, are still numerous in the most densely wooded districts, and at certain seasons the sportsman has little difficulty in finding water-fowl, pigeons, partridges, quail, and other small game. Fish abound in all the rivers and most of the lakes, and large quantities are taken every year in the Ohio and the Wabash and off the lake shore.

The annual mean temperature in the region south of the parallel of Indianapolis is about 56° Fahrenheit. According to the observations of the United States Signal Corps, the lowest annual mean at Indianapolis, in the period of fourteen years from 1866 to 1878 inclusive, was 50.46°, and the highest mean for any year was 56.46°. The mean temperature of the hottest week of 1872 ranged from 85° in the northern counties to 90° at Indianapolis and Vincennes; while the mean of the coldest week of the following winter, ranged from ten above zero on the Ohio to zero at Michigan City. In the northern half of the State, the mean annual rainfall ranges from thirty-six inches on the Michigan line to forty-four at Lafayette, diminishes to forty inches a few miles below Lafayette, and continues at that through the entire length of the Wabash valley to the Ohio river. For all the rest of the State, including all the region south and east of the latitude of Indianapolis and the west fork of the White river, it is set down in the Smithsonian chart at forty-four inches, but, according to local observations, it is rather more than this in the three or four counties on the Ohio, next the Ohio line. There is considerable fluctuation from year to year. In the

observations of the Signal Corps, at Indianapolis, during a period of fourteen years, the lowest annual mean rainfall was 35.13 inches, while the highest was 56.56.

The climate can hardly be called equable, as the markings of the thermometer and rain gauge above given very plainly show. Yet, that it is favorable to agriculture is clearly demonstrated by the crop reports I shall present; while the vital statistics show that it is salubrious. Twenty-six in every thousand persons dying in 1870 had lived beyond fourscore years. One hundred and forty in every thousand lived beyond threescore. In three or four counties of that angle of the State where the rainfall is the heaviest, one-fifth of all the deaths were from consumption. The mortality from this cause in the rest of the State diminishes as one goes northward to one in six or seven. In most of the counties around the headwaters of the Wabash and the Kankakee, and in the northwest angle, for some thirty or forty miles back from Lake Michigan, it falls to one in eight or nine. With the exception of the counties in the forks of the White, and in the southwestern projection of the State, between the Ohio and the Wabash, where the deaths from malarial diseases registered about one in twelve, the deaths from malarial causes were not numerous, ranging from one in seventy-five in all the southern half of the State except the portions delineated, to one in twenty-five in the northern half. Deaths from intestinal diseases are rare in all that half of the State south and east of a line from Fort Wayne to Terre Haute, except a narrow strip along the Ohio and the Lower Wabash, numbering from one to two in a hundred: in the rest of Indiana they numbered from five to nine. Enteric, cerebro-spinal meningitis, and typhus fevers together carried off from nine to fourteen per cent. of the decedents in the portion of the State south of a line from Lawrenceburg to a little north of Terre Haute; from five to nine in all the eastern two-thirds of the remainder, except two narrow strips along the Ohio line, and from three to five in the balance, stretching west to Illinois and northward to the lake.

It is now just two hundred and one years since the bold Chevalier de La Salle, on his first expedition to explore the country of the Illini, entered Indiana by ascending the St. Joseph river to the portage from that stream into the Kankakee, at a point not far from South Bend. Transferring his boats to the

Kankakee, he pushed his explorations down this stream and the Illinois river to Lake Peoria, and finally to the Mississippi. It was not until more than twenty years later, in 1702, that French traders established something like permanent trading stations in Indiana, and it was nearly fifty years before the Wabash and Miami (now Maumee) rivers and the portage near Fort Wayne became one of the principal routes of transportation for the French and Indian traffic between Canada and the Mississippi. In 1765, the French and half-breeds at Vincennes, Ouiatanon, and the head of the Maumee, numbered 104 to 116 families,* or about 520 inhabitants. Soon after the capture of Vincennes by Col. George Rogers Clarke, more particularly noticed elsewhere, under authority from the government of Virginia, "for the preservation of peace and the administration of justice," a court of justice was established at Vincennes in June, 1779. It was composed of Col. J. M. P. Legras, Commandant at Port Vincennes, President, and several magistrates. Pursuing the customs and usages of the French commandants, their predecessors, these magistrates granted tracts of land to the inhabitants, both French and Americans; showing special liberality in their grants to civil and military officers of the country. Winthrop Sargent declared, in a letter to General Washington on this subject, that between 1783 and 1787, when General Harmar interdicted the practice, 22,000 acres of land had been granted to individuals by the court of Vincennes. Before the period here named, 26,000 acres had been granted to individual applicants, in parcels from the size of house lots to farms of 400 acres. In the spring of 1780† three large "family boats" arrived at the Falls of the Ohio. In 1793 the population of Vincennes was estimated at 1,500 souls, chiefly of French and Indian extraction, but including a number of Americans, principally from Virginia, North Carolina, and Kentucky. Settlements had been begun at various places along the Ohio and the Whitewater rivers.

After Virginia ceded her claims to this country to the United States, and the Northwest Territory was organized by Governor St. Clair, the administration of affairs at Vincennes passed into the hands of this new government. On the 7th of May, 1800, Ohio having been erected into a separate Territory, the Territory of Indiana was organized, with William Henry Harrison, formerly of Ohio, as Governor. The population from this first year

* George Croghan's Journal. † Butler's Kentucky, p. 98.

of its history down to 1880, in decennial periods, is as follows:

Censuses.	White Population.	Free Colored Population.	Slaves.	Total Population.	Per cent. Increase
1800	5,343	168	135	5,641	.....
1810	23,890	393	237	24,520	334
1820	145,758	1,230	190	147,178	500
1830	339,399	3,629	3	343,031	133
1840	678,698	7,165	3	685,866	99
1850	977,154	11,262	.....	988,416	44
1860	1,338,710	11,428	.....	1,350,428	36
1870	1,655,837	24,560	.....	*1,680,637	24
1880	1,909,094	39,368	.....	†1,978,369	17

Slavery was established in Louisiana by decree of Louis XV. The ordinance of 1787 consecrated the Northwest Territory to freedom. Great efforts were made by a large body of the early settlers to have this provision of the ordinance annulled, but the Southern leaders in Congress combined with the great statesmen of the North to preserve the ordinance inviolate. For nearly fifty years, however, there was a party in Southern Indiana in favor of tolerating slavery within the State; and by one means and another slaves were held until after 1840, although during much of this period the servitude was virtually voluntary. It will be seen from an inspection of the table above given, that, while Indiana gained less than 20,000 in population during the first ten years of its Territorial existence, in the next decade, during which it took up (in 1816) the powers of State government, it increased more than 122,000. In the following decade it gained nearly 200,000; and since then the population has grown at the rate of nearly 300,000 each ten years.

Indiana is eminently an agricultural State. It has nearly four times as many persons engaged in agriculture as in manufactures, and more than seven times as many as are employed in trade and transportation. The plowed land and meadows, according to the State Statistician's report for 1879, amount to 9,297,006 acres, and the pasture lands to 2,108,501 acres. The following table shows the acreage and total yield of the principal crops, according to the reports of the United States Agricultural Bureau for 1869 and 1879:‡

* Of whom 1,838,198 were natives, and 141,474, foreigners.

† Of whom 1,784,597 were natives, and 143,765, foreigners.

‡ The corn crop of 1880, according to this same authority, was but 111,055,800 bushels, and the wheat crop but 35,341,920 bushels.

Products.	Acreage in each crop.	Per cent. of increase in ten years.	Total yield in 1880.	Total yield in 1870.
Indian corn	4,068,500	90	51,094,538	124,920,800
Wheat	2,158,200	50	27,747,222	42,709,960
Rye	28,800	.....	457,468	504,000
Oats	496,700	18	8,590,409	14,036,310
Barley	20,400	.....	356,263	550,800
Buckwheat	8,000	.....	80,291	160,000
Potatoes	60,000	33	5,399,044	4,060,000
Tobacco	7,900	21	9,325,399	6,636,000
Hay	1,166,281	44	1,076,708	1,411,200

The value of these nine crops of 1879, above given, was estimated, by the same authority, at $117,731,814, as against $100,277,599 in 1869. The total value of all farm productions of Indiana, in 1870, including betterments, and additions to stock, according to the Census Bureau, was $122,914,309. In 1880, the State Statistician, Mr. John Collett, gives the estimated value of the principal farm, orchard, vineyard, and garden crops at $177,771,832, including 35,992,180 bushels of apples, 4,244,445 bushels of peaches, 122,157,613 gallons of milk, 28,617,086 pounds of butter, 18,581,524 dozen eggs, 3,893,715 pounds of wool, 5,662,204 pounds of tobacco, 6,729,265 pounds of grapes, 1,588,232 gallons of sorghum molasses, and 250,754 pounds of maple sugar. Add to the above $177,771,832, Mr. Collett's estimate of value of principal farm animals, $127,152,256; also his estimate of value of poultry, $2,802,015; and value of stands of bees, $438,981; and we have a grand total of $308,165,064 as the estimated value of the farm products of Indiana, in 1880; an aggregate which, it is thought, will not differ materially from the forthcoming estimates of the Census Bureau.

The following are the statistics of the principal cereal crops of Indiana in 1859, 1869, and 1879, in bushels, as given in the Census tables for 1860, 1870, and 1880:

Crops.	1860.	1870.	1880.
Wheat	16,848,367	27,747,222	47,994,853
Rye	462,495	457,468	806,106
Oats	5,817,881	8,590,409	15,590,516
Indian corn	71,586,919	51,094,538	115,455,900
Buckwheat	396,960	80,291	99,707
Barley	889,945	356,263	889,595
Totals	94,997,746	88,326,190	179,142,618

The following table shows the total annual yield and the yield per acre of the nine principal crops of Indiana, averaged for five years; also the price per bushel, pound, or ton, the total value and the value of the yield per acre, of each crop averaged for the same period:

Crops.	Total yield of crops of 1879 in bush's, pounds or tons.	Average annual yield in bushels, pounds, or tons for 5 yrs., ending 1879.	Avg. price per bushel, pound or ton for 5 years.	Average annual value of crops for 5 years ending with 1879.	Av'ge annual yield p'r acre for 5 yrs. ending 1879.	Avg. ann'l value per acre for 5 yrs. ending 1879.
Indian corn	51,094,538	112,634,500	$ .33	$37,310,202	31.9 bu.	$10.74
Wheat	37,747,222	27,745,195	1.02	28,580,082	14.1 "	14.60
Rye	457,468	465,800	.64	299,758	14.2 "	9.17
Oats	8,590,409	15,107,102	.27	4,115,813	26.9 "	7.29
Barley	356,262	472,700	.83	394,456	21.0 "	17.56
Buckwheat	80,291	156,880	.75	119,118	17.8 "	13.59
Potatoes	5,899,044	4,694,000	.43	2,010,320	77.0 "	33.74
Tobacco	9,325,392	11,088,000	.04.9	567,290	737.0 lbs	35.28
Hay	1,076,768	1,368,240	8.49	10,563,401	1.28 T	10.81

The total cereal products of Indiana in 1879, was 156,581,677 bushels, on 6,794,600 acres; an average of 23.04 bushels per acre, against an average yield in France (statistics of 1875) of 16.46 bushels per acre. The average yield of wheat alone, was 20.3 bushels per acre, which was more than the average yearly yield in France, and, according to the Board of Trade Reports, considerably more than the yield for the same year in England.

The principal farm animals of this State in January, 1880,* were, horses, 688,800; mules, 58,800; milch cows, 434,800; oxen and other cattle, 756,600; sheep, 1,019,000; hogs, 2,186,000; an aggregate of 5,144,000 head, with a total value of $68,806,248. The following table shows the number of farm animals of Indiana averaged for five years; also the price per head, and the annual total value averaged for the same period:

Farm Animals.	Number in February, 1870.	Numb'r of farm animals averaged for the 5 years ending January, 1880.	Price per head averaged for the five years ending January, 1880.	Total annual value averaged for five years.
Horses	555,000	679,400	$ 54.15	$36,791,500
Mules	35,700	60,320	61.65	3,712,585
Oxen and other cattle	575,000	766,040	18.32	14,061,349
Milch cows	427,000	467,460	25.89	11,393,788
Sheep	2,160,500	1,115,240	2.28	2,558,332
Hogs	2,025,000	2,289,020	5.43	12,345,644
Totals	5,778,200	5,347,480		$80,769,259

* According to the statistics of the Agricultural Bureau. The assessors' returns would diminish these figures, except as regards the number of hogs, which it would increase by 440,980.

The difference between the total value of the farm animals of this State averaged for five years, and the total value for the year ending January, 1880, is due mainly to the financial condition of the country, including the change from an irredeemable paper currency to specie or its equivalent. It will be observed, that, while the total value of farm animals in 1879 dropped nearly $12,000,000 below the average for the five years, the total number of farm animals decreased but 203,480. Within the ten years ending Jan. 1, 1880, the number of horses increased twenty-four per cent.; of mules, sixty-four per cent.; of oxen, thirty-one per cent.; of hogs, sixteen per cent.; while the milch cows increased in number less than twenty per cent.; and the sheep decreased more than half, or over fifty-two per cent.

The richest wheat and corn bearing districts of Indiana are the valleys of the Wabash, the White, the Whitewater, the Kankakee, and the St. Joseph rivers. Here, too, are found much the largest proportion of horses, cattle, and swine. According to the State statistics for 1879, fully thirty-five per cent. of the corn crop of that year was produced in the twenty-two counties of the Wabash valley.

The finest and most abundant fruit-growing section is in the north. With the exception of Tipton, all the counties that in 1879 reported over 100,000 bushels of fruit lie in a cluster northeast of a line drawn from Michigan City to Portland, in Jay county. Indeed, St. Joseph, Kosciusko, Wabash, Huntington, Allen, and the six counties between there and the Michigan line, produced 1,852,761 bushels, or fifty-three per cent. of the yield of the whole State. These same counties reported 1,646,838 gallons of cider, which was seventy per cent. of the total production.

Sheep raising in Indiana is a feeble industry compared with the same pursuit in Ohio. The counties reported by the township trustees as having more than 15,000 sheep apiece in 1879, belong almost entirely to what I have designated as the fruit-growing section, in the northeastern angle of the State, to the valleys of the Wabash and the West Fork of the White river, and the country between. The five counties adjoining Michigan contained one-eighth of all the flocks of the ninety-two counties.

Wine was made in Indiana in very early days. Mr. Coxe, the "Father of American statistics," in remarks accompanying the

Census of 1810, says: "About ninety-six quarter-casks of good red wine have been made by a few Swiss settlers, from the Madeira and Cape of Good Hope grapes, on the Ohio river, in about 39° north latitude, in the Territory of Indiana." He was greatly interested in this new industry, which he firmly believed would be developed to large proportions. He prepared a table showing the latitudes in which the noted wines of Europe are produced, and the parallels of corresponding climate in this country, according to the best meteorological data of that time, and he inferred that skilled vintners could make this industry profitable in the United States. This table is not without interest now; and it is herewith given:

TABLE FROM T. COXE'S REPORT TO THE SECRETARY OF STATE, ACCOMPANYING INDUSTRIAL STATISTICS OF 1810, PAGE XVIII.

Wines.	Latitude in Europe in which produced.		Corresponding Degrees in America.	
Moselle, Rhenish, and Hock	49°	to 50°	40°	to 41°
Champagne	49°		40°	
Burgundy (the most exquisite)	49°	to 48°	38°	to 39°
Claret, Sauterne, and Grave	44° 30′	to 45° 30′	35° 30′	to 36° 30′
Oporto, or Port	41° 30′	to 20° 30′	32°	to 20°
Lisbon and Carcavella	38° 30′	to 39° 30′	29° 30′	to 30° 30′
Xeres (or Sherry), St. Lucas, and Malaga	37°	to 38°	28°	to 29°

Mr. Coxe's hopes have not been realized in Indiana, although the cultivation of the grape, and wine manufacture, were carried so far that Switzerland county became quite noted in this connection, and other counties along the Ohio and Whitewater rivers followed its example. Of late years the "vine rot," and other discouragements, have combined with the temptations to more profitable or less uncertain occupations, to reduce the quantity of grapes and wine produced. In 1879, the wine manufacture of the State amounted to but 65,357 gallons.

Tobacco growing is also limited, for the most part, to the southern counties; ninety per cent. of the crop of 1878, according to the State statistics, being raised in the three adjoining river counties, Warrick, Spencer, and Perry, and their next neighbors on the north, Pike and Dubois. Although the average annual value of this crop for the five years included in the above table was $35.23 per acre, exceeding that of any other crop, yet the expenses and risks incurred in cultivating and curing it have led to a considerable reduction in the product;

the farmers preferring crops not so subject to the vicissitudes of weather and fluctuations of the market. The large increase, since 1870, of the number of factories for the manufacture of butter and cheese has added very considerably to the product of these articles. The State Statistician estimates the butter made in the year ending April, 1880, at 28,617,086 pounds, worth $5,222,618. There is no good reason why Northern Indiana should stand far behind Northern Ohio and Illinois in dairy farming.

The average assessment of farm property for the whole State, was $16.50 per acre, and $15.47 per capita. Unimproved lands may be bought at from $10 to $20 per acre in the greater part of Indiana, and even at lower prices in the southwestern portion. Improved farms range from $20 to $60 per acre, one-fourth in cash, and the remainder on deferred payments. It is considered, that, even at the last-named price, a practical farmer may with economy and management make the deferred payments from the profits of his farm within five years.

An inspection of the crop reports of the State Statistician shows that the yield of corn ranges, in different parts of the State, from ten bushels to the acre up to 120 bushels, and wheat from five to sixty-four, and even, in rare instances, seventy-eight, bushels per acre. I have already shown that the wheat yield, averaged for five years, was fourteen bushels, and the corn yield thirty-one bushels. Corn is raised by contract at twelve cents per bushel delivered into granaries, all the expenses being borne by the cultivator, whose profits at this rate usually range from $7 to $10 per acre. Mr. Collett estimates the expenses of a wheat crop, for labor, seeds, implements, harvesting, and threshing, at $6 to $8.50 per acre, leaving an average profit of $7. He estimates the average profits on an oat crop at $3 to $5, and on hay at $4 to $8, per acre. The increase in the number of farms, and the reduction in the average acreage for each, is due in part to the readiness with which large farms are subdivided by landholders. Undoubtedly, young farmers, trained for their business and full of energy, can, by application and perseverance, work their way to the possession of good farms.

From 1820 to 1840, the growth of the manufacturing interests of Indiana was exceedingly slow. Since 1850, however, this class of industries has gained rapidly in importance, as is plainly shown by the following tabular statement taken from the

State Statistician's Report for 1879, p. 271. It is defective in many details, but may be considered a fair estimate of the manufacturing interests of the State.

Business.	No. of establishments.	Capital invested.	Value of raw material used.	Value of manufactured products.	Number of employés.	Annual wages paid, including superintendence.	Other expenses, including taxes, insurance, repairs, etc.
Agricultural implem'ts.	134	$2,931,946	$1,472,625	$4,581,595	1,284	$1,030,729	$ 44,488
Barrel factories	50	36,500	64,400	220,085	264	80,326	36,728
Blacksmithing	3,126	1,695,780	1,427,497	3,966,660	1,716	688,296	278,196
Boots and shoes	1,132	475,447	942,978	1,913,260	1,633	600,695	111,698
Brewers	93	1,457,288	721,274	1,421,073	396	211,567	203,321
Brick (common)	419	465,139	185,741	966,810	1,988	540,574	108,036
Brick (fire)	37	25,450	4,196	70,350	87	24,900	1,600
Carriages	970	980,261	897,358	1,707,370	1,111	456,655	94,257
Cement	11	187,000	45,750	194,490	103	18,138	89,055
Cigars	213	205,650	422,511	900,477	655	280,650	92,510
Coal mining	274	5,420,508	4,382,286	26,046,660	8,397	3,534,392	1,466,159
Coffins	238	1,159,830	324,662	946,444	538	154,416	68,796
Coopering	643	945,160	2,088,515	3,723,458	1,983	642,196	80,466
Cotton mills	5	1,125,000	1,995,780	3,119,720	661	178,184	60,633
Dairies	231	265,980	259,455	565,898	686	109,851	36,276
Distilleries	26	468,819	1,021,004	3,547,515	213	94,698	97,261
Drain tiles	207	205,650	98,305	626,730	946	143,609	51,085
Flouring mills	934	9,317,804	21,625,770	26,886,491	1,740	661,491	605,650
Foundries	71	2,704,500	2,300,310	5,296,200	2,144	691,200	203,985
Furniture	230	2,085,410	1,779,471	4,177,899	2,750	951,750	285,510
Gas works	17	2,279,700	191,728	408,665	286	135,760	50,081
Harness and saddle	317	604,573	960,258	1,776,855	717	295,500	79,039
Marble works	175	261,573	342,311	605,260	357	139,267	37,044
Machine works	61	2,205,414	1,259,141	3,362,295	1,540	725,780	233,845
Merchant tailoring	236	291,500	930,766	1,372,636	726	261,252	89,725
Photographing	225	145,165	61,978	277,419	185	84,720	54,486
Planing mills	206	2,625,744	2,285,197	3,919,174	1,774	779,278	176,289
Potteries	55	56,750	24,750	180,630	111	32,148	13,840
Saw mills	1,209	5,160,744	5,462,094	11,264,625	4,504	1,329,574	553,257
Sewer pipes	6	21,000	51,080	97,040	38	13,680	11,240
Stave factories	168	1,078,120	2,227,194	4,252,304	1,528	560,120	52,345
Stone quarrying	445	1,144,767	209,686	1,468,616	893	105,711	68,286
Wagon factories	268	719,473	777,748	1,813,749	644	242,986	64,720
Miscellaneous	1,742	26,443,560	27,090,964	64,072,748	23,084	8,254,396	2,366,431
Totals	14,490	$76,341,729	$97,342,660	185,000,220	57,909	$24,195,057	$8,014,917

The growth of the manufacturing industries from decade to decade, is exhibited by the following carefully prepared statement:

Items.	1850.	1860.	1870.	1880.*
Number of establishments	4,392	5,328	11,847	14,490
Number of hands employed	14,440	21,995	58,852	† 57,909
Capital invested	$ 7,750,402	$18,451,121	$53,069,435	$76,341,728
Amount of wages paid	3,728,844	6,318,335	18,986,780	24,195,057
Materials	10,869,700	27,142,507	68,185,493	97,342,660
Products	18,735,433	43,800,469	108,617,378	185,000,220

The value of the products per capita of the hands employed, was $1,296.77 in 1850, about $2,010 in 1860, and $1,845.60 in

* Collett's Report, p. 271.

† It is evident that the State Statistician's returns are below the real number.

1870. The average product per capita for 1880 is probably about $2,000. It is hardly safe, owing to the consolidation of manufacturing capital and the improvements in machinery, to compare the growth in the numbers of establishments and the hands employed. One firm may have quadrupled its capital, and by the aid of improved machinery one man may produce more than half a dozen could without such aid. In the subjoined table I show the percentage of the increase in capital invested, wages paid, material used, and products manufactured in Indiana for the decades ending 1860, 1870, and 1880:

Items.	1860.	1870.	1880.
	Per cent. of increase.	Per cent. of increase.	Per cent. of increase.
Capital invested	126	161	46
Wages paid	60	190	31
Materials	161	133	54
Products	128	133	70

Since 1850, therefore, the total increase in the amount of capital invested in manufacturing is 884 per cent.; in products, no less than 889 per cent.; in materials used, 840 per cent., and in wages paid, 547 per cent. No more wonderful exhibit of the extension of manufacturing industries in our prairie States can be given than the percentages of their persistent growth.

Attention is called below to a table showing the principal industries of Indiana according to the Census of 1880:

Business.	No. of Establishments.	Capital, Dollars.	Greatest number of Hands employed at any one time during the year.	Average number of hands employed.			Total Amount Paid in Wages during the year, Dollars.	Materials, Dollars.	Products, Dollars.
				Males above 16 years.	Females above 15 years.	Children and Youth.			
Agricultural implements	66	1,977,494	2,026	2,121	1	91	980,154	1,266,219	4,120,000
Brick and tile	721	1,445,764	2,027	2,001	27	900	998,164	998,277	1,619,240
Cheese and butter	46	79,340	127	100	14	8	37,120	121,000	208,000
Flour and grist mill products	977	9,363,570	4,000	1,715	7	81	1,097,000	26,400,000	29,000,113
Leather, tanned and curried	136	1,035,000	800	270	....	10	174,941	2,156,477	3,772,000
Lumber	1,000	14,727,410	16,250	10,040	19	900	3,400,000	8,000,000	12,000,000
Slaughtering & meat packing	12	1,107,000	800	800	....	40	60,000	1,000,000	1,000,000
Slaughtering & meat packing	1	40,000	180	....	....	....	10,000	250,000	275,000
	4,031	32,000,000	33,170	18,451	82	800	6,611,379	39,997,000	54,000,000

According to the reports of the Bradstreet Commercial Agency, there were, in 1880, the following *bona-fide* commercial houses, manufacturing firms, and incorporated manufactories in Indiana:

Industry.	Number.	Capital.		Wealth.		
		Capital and Personal Property.	Real Estate.	Total.	Average.	
Commercial houses	15,919	$62,495,780	$20,495,323	$115,366,945	$ 7,247	.....
Manufacturing firms	3,191	28,085,300	21,199,600	45,897,175	14,427	.....
Mechanical industries	4,473	1,474,585	1,089,000	2,253,945	726	.....
	Number.	Authorized Capital.	Paid in.	Real Estate, including Fixed Machinery.	Total Wealth.	Average Wealth.
Incorporated manufactories	147	$12,804,750	$12,452,250	$5,804,803	$16,072,434	$109,338

In the above table only firms entitled to credit are included, and hundreds of small manufacturers who carry on their calling at home or in little shops attached to their dwellings, are excluded. The State Statistician, in his report on the commercial industries of Indiana, shows a greater number; but his total capital and average capital are much less than the figures given by Bradstreet, as the following table shows:

Colleyy.				Bradstreet.			
Class.	Establishments.	Capital.	Average.	Class.	Establishments.	Capital.	Average.
Manufactures	14,460	$76,241,726	5,273	Manufactures	7,810	$ 64,734,854	$8,287
Dealers	19,009	51,371,089	2,697	Commercial houses	15,919	115,366,945	7,247
Totals	33,469	$127,612,817	3,815	Totals	23,729	$180,099,799	7,589

It is very difficult to collect all the facts essential to accurate and comprehensive knowledge of the capital actually employed, the material consumed, and the full product, of the factories of a single great city; and it is impossible, in the present state of legislation, to accomplish this, more than approximately, for an entire State.

Some idea of the number of establishments, and amount of capital invested in the various commercial interests of the State, may be gleaned from the following table, compiled from Bradstreet's Commercial Reports for 1880:

Industry.	Establishments.	Capital.
Dry goods	691	$11,010,980
General stores	2,384	20,106,235
Groceries and provisions	2,410	17,223,845
Drugs	1,291	7,247,350
Liquors, saloons, etc.	1,714	4,487,945
Hardware	486	7,768,000
Live stock	113	1,956,100
Boots and shoes	578	3,961,800
Lumber	354	6,036,900
Hotel	467	2,678,450
Millinery	649	1,000,330
Agricultural implements	278	1,876,100

Here, as in the other Western States, the first settlements were made along the natural channels of transportation, and extended as these were improved, and united by canals. The importance of good roads was felt in very early days, and the general government made land grants to aid in the construction both of highways and canals—the grants for the latter purpose aggregating no less than 1,439,279.41 acres, or almost a fifteenth part of the entire land area of the State. Then followed the present era of railways. The record of all these improvements is stamped on the soil in enhanced value, and commemorated in the history of the birth and progress of nearly every considerable town and city in the State. Eight of the twenty-three cities and towns of over 5,000 inhabitants, stand along the Wabash and the line of the Wabash & Erie canal; five of them along the Ohio; the remaining twelve owe their present magnitude mainly to the marvelous development of the railway systems of the country, which has enabled them to compete with the river towns. Not only are all the great manufacturing industries distributed along the rivers, canals, and railways, but the statistics of agriculture and the assessors' records show the wealth of the farming communities, stretching in golden belts along the lines of cheap or rapid transportation, the farms rising or sinking in valuation as these lines approach or trend away from them. The common pioneer roads of the prairie States, winding their way across the unwooded, sunny undulations of these native meadows, cost but a trifle compared with those of a thickly timbered region like Ohio and Indiana, where the settler had to hew his way to the spot selected for his cabin and then clear his farm of forest trees and underbrush. The common highways of Indiana represent labor worth many millions of dollars.

Besides 54,813 miles of common roads, constructed at an estimated cost of more than twenty-two and a half million dollars, there are 332½ miles of free gravel road, costing $625,455; and 2,060 miles of toll roads, made at an expense of $3,672,454. There are two canals. The Wabash & Erie, from Evansville to Toledo, part of the way by slack-water navigation on the Wabash and Maumee rivers, is 467 miles in length, 379 of which are in Indiana. It was of great service until the railways supplanted it in the upper part of its course, and the portion between Fort Wayne and Lafayette is now unused. The Whitewater canal extends from Lawrenceburg, on the Ohio, to Hagerstown, almost directly north of it, and is seventy-five miles in length. These canals, with the line of 380 miles of the Ohio along the Indiana boundary and the several hundred miles of navigation on the Wabash, may be said to complete the water transportation of the State, except for rafts and flat-boats. There were sixty-nine steam vessels, of 6,780 tons, and forty barges, of 4,215.75 tons, enrolled and licensed in Indiana, June 30, 1879. Twelve steam vessels, of 573.66 tons, and sixteen barges, of 807.43 tons, were built in the customs district of Evansville. The construction of railroads in Indiana began about 1840, but progressed very slowly, so that in 1845 there were but thirty miles in operation. Between this date and 1850 several important lines of railway were chartered, and pushed forward with rapidity, so that in 1855 there were 1,406 miles of road in operation within the State.

The level character of the surface and the abundance of timber render construction cheap, and the geographical position of the State compels the great east and west roads of the Northern States to pass across its entire breadth. Trunk roads from Chicago and Michigan, seeking Cincinnati, Louisville, and the far South, cross it diagonally and lengthwise. Other roads push northward from Central and Southern Illinois to reach Lake Erie, and connect with the great trunk lines of the North, until now the whole State is interlaced with railways. The number of miles increased from 2,217 in 1865 to 4,529 miles in 1880. There were, in all, sixty-four railways in 1879, of which eleven carried 3,022,437 passengers and 8,071,776 tons of freight. They were equipped with 812 engines, 591 passenger, baggage, express, and mail cars, and 18,452 freight cars. The capital stock and funded debt amounted to $306,486,075; the cost of railroads

and equipments was $188,726,511; the gross earnings reached $20,331,375; the net earnings amounted to $6,485,782; the amount paid on interest account was $5,417,774, and on dividends, $404,162. Five of these roads control over one hundred miles each, two over 150 miles, and eleven have between 200 and 350 miles each. Several others form continuous lines of grand proportions. The Pittsburgh & Fort Wayne line is 468 miles in length. The Chicago, Columbus & Indianapolis is 580, the Ohio & Mississippi is 615, and the Michigan Central is 804 miles in length; while the Lake Shore & Michigan Southern extends 1,177.67 miles, and the Wabash, St. Louis & Pacific, 1,301.76 miles.

The number of banks and the capital employed in banking in Indiana correspond with the fact that her commerce is chiefly engaged in disposing of her own products and supplying the wants of her own people. The following statistics indicate the measure of service rendered, and the security afforded depositors by the several kinds of banks. In 1879, seventy-four national banks, fifteen State, fifty-three private, and five savings banks made returns to the State Statistician. The national banks had $10,733,500 capital, $7,752,760 circulation, and $10,023,018.33 in deposits. Their discounts amounted to $15,223,684.89. The fifteen savings banks had a capital of $833,950; and their deposits amounted to $984,585.42. The fifty-three private banks had a capital of $2,095,191.07, surplus funds and undivided profits amounting to $288,343,171, and deposits to the amount of $3,453,960.09. Their loans, discounts, and over-drafts amounted to $3,383,985.57. The five savings banks held a capital of only $50,000, and surplus funds amounting to $32,953.64, belonging mostly to clerks, mechanics, and laborers. Their deposits were $639,474.05. Their discounts reached $524,164.60. The paucity of these deposits is due chiefly to the fact, that, in this State, cheap homes on easy payments, absorb the savings of a large proportion of the classes which in other States deposit their savings in bank. There is, moreover, a feeling that the banking law is not all that it should be. Besides the foregoing, there were sixty-two banks which refused or failed to report when called upon.

Indiana is one of the wealthy States of the Union. The assessed value of the real estate as returned by the local assessors is $672,142,081; and the personal property, $178,336,747; making

the total assessed value, $850,478,828. The true value of property in the State is not less than $1,700,000,000. The credit of the State stands high. In the decade ending 1840, Indiana, with her sister State of Illinois, was allured from the path of wisdom and economy by the seductive spirit of speculation, and was induced to embark in an expensive system of internal improvements. The State debt at this time was upwards of $13,000,000, the population but 750,000, and the amount of taxable property, $97,000,000. For a time it was impossible to pay, but the development of its resources has since enabled it to pay every dollar of the old debt, and the State debt is now less than $5,000,000. The following table shows the present State and local debt of Indiana:*

Total State debt	$ 4,998,178
Total county debt	5,060,767
Total city debt	10,227,249
Total debt of school corporations	805,368

The State tax, as computed by the Census office, is $1,190,671. The following table† shows the population, assessed valuation of property, tax levy, rate of taxation, gross debt, receipts and expenditures, of the twelve cities in the State having a population of 7,500 and upward, for the year 1880:

Towns.	Population.	Total Assessed Valuation.	Total Tax Levy.	Rate of Tax.	Outstand'g Bonded Debt.	Total Receipts.	Total Expenditures.
Evansville	29,280	$17,307,725	$358,495	2.327—	$1,084,000	.....	.....
Fort Wayne	26,880	13,480,075	346,495	2.576+	856,900	$543,880	$414,150
Indianapolis	75,074	48,009,940	770,133	1.60 +	1,914,500	954,543	485,564
Jeffersonville	10,422	2,536,964	79,456	3.132+	363,500	108,084	93,260
La Fayette	14,860	9,263,490	173,847	1.877—	200,000	207,826	193,219
Logansport	11,196	5,216,895	158,231	3.03	407,000	115,705	97,878
Madison	8,945	3,302,850	84,973	2.189+	101,700	107,248	74,089
New Albany	16,422	9,725,390	81,960	2.20	348,500	132,856	125,699
Richmond	12,743	7,785,850	143,251	1.84	167,000	98,401	83,132
South Bend	13,279	4,809,005	95,794	1.98 —	223,900	71,774	45,911
Terre Haute	26,040	12,562,625	245,488	1.81	213,000	139,918	105,268
Vincennes	7,680	3,631,053	71,041	2.07	82,000	43,841	35,708
Totals	256,823	$122,492,191	$2,796,980	2.11	$6,958,700	$2,512,566	$1,694,908

The bonded debt of the twelve large cities of Indiana, according to the Census of 1880, is $6,958,700. I have prepared with great care the following table, showing the purposes for which this debt was contracted:

* These figures are taken from a report made by the State in 1879.

† This table is compiled from returns sent to the Census office by the authorities of the different cities.

Cemeteries	$ 11,100
Fire department	16,000
Funding floating debt	115,400
Improvement of harbors, rivers, wharves, canals, and water power	105,000
Parks and public places	130,500
Public buildings	1,700
Railroad and other aid	$3,707,500
Refunding old debt	2,257,500
Schools and libraries	201,000
Streets	23,000
Water works	1,330,000
Total	$6,958,700

That the reader may know the rates of interest which this debt draws, I present the subjoined schedule. It shows that nearly two-thirds of the whole is funded at moderate rates.

Per Cent.	Amount.	Per Cent.	Amount.
10	$ 257,900	6	$3,353,600
8	922,700	5	49,000
7 3-10	1,697,500		
7	1,679,000	Total	$6,958,700

A careful analysis of the returns from all these cities shows the amounts of this debt issued each year, and the amounts maturing in the years named below:

Amounts Issued in Years Named.		Amounts Maturing in Years Named.	
Previous to 1860	.....	Overdue	$ 900
1860	.....	1880	120,500
1861	.....	1881	106,000
1862	.....	1882	95,000
1863	.....	1883	21,000
1864	.....	1884	62,000
1865	.....	1885	36,100
1866	.....	1886	49,000
1867	$ 67,000	1887	119,000
1868	499 000	1888	251,000
1869	416,900	1889	314,000
1870	1,028,500	1890	520,500
1871	97,000	1891	2,000
1872	418,700	1892	238,700
1873	743,000	1893	868,000
1874	536,500	1894	489,500
1875	706,500	1895	1,187,000
1876	677,500	1896	165,000
1877	700,000	1897	500,000
1878	235,500	1898	227,500
1879	434,000	1899	334,000
1880	898,600	1900	171,600
		After 1900	980,000
Total	$6,958,700	Total	$6 958,700

The subjoined table shows the population of these cities at the last three decennial periods, together with the total assessed valuation, estimated true value of real estate and personal property, and the total bonded and floating debt of the cities named:

Cities.	Popular'n 1860.	Popular'n 1870.	Popular'n 1880.	Total Assess'd Value of R. E. and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of R. E. and Personal Property.	Total Bonded and Floating Debt.
Evansville	11,484	21,830	29,280	$17,307,735	$20,626,791	$27,514,388	$1,984,000
Fort Wayne	.....	17,718	26,880	13,450,073	14,500,000	19,027,466	956,900
Indianapolis	18,611	48,244	75,074	48,099,940	51,046,313	68,064,417	1,914,500
Jeffersonville	4,020	7,254	10,422	3,026,264	2,668,792	3,558,394	294,350
Lafayette	9,207	18,506	14,860	9,263,490	9,096,254	12,115,286	300,000
Logansport	3,979	8,950	11,196	5,216,825	5,256,548	7,011,394	456,276
Madison	8,120	10,709	6,945	3,902,250	3,349,845	4,466,460	223,051
New Albany	12,647	15,396	16,422	3,725,360	3,421,015	4,561,353	258,492
Richmond	6,468	9,445	13,748	7,735,350	6,143,996	8,191,961	147,000
South Bend	5,924	7,206	13,279	4,809,008	3,776,250	5,035,000	387,600
Terre Haute	9,564	16,103	26,040	13,562,695	12,778,853	17,051,804	991,499
Vincennes	8,960	5,440	7,680	3,431,954	3,233,256	4,311,141	92,000
Totals	90,218	181,801	252,823	$132,402,191	$125,402,191	$180,950,588	$7,374,648

Ohio stands first among the Western States in the number of her church sittings, which are nearly equal to full provision for the entire population. Indiana stands very near to Ohio in this regard. Of the church accommodations, the Methodists have about one-third of the whole, the Baptists something more than one-sixth, the Presbyterians and the Christians each about one-eighth, and other denominations the remainder. Until 1870, throughout the greater part of Indiana, the public schools were of an inferior order. During the past decade the improvement has been very striking. Superintendents, teachers, and people have been inspired with a species of enthusiasm on this subject. A system of county institutes has been ordained; and the attendance of teachers has been made compulsory, fines being imposed for neglect of this duty. Besides this, there were 4,530 township institutes held in 1880. A large State tax is raised, which is distributed *pro rata* on the basis of school population, so that the wealthier counties contribute to instruction in the poorer ones. This tax, added to the very large permanent school fund derived from Congressional grants, pays more per capita towards the support of public instruction, I believe, than the general fund of any other State.

The following table indicates the growth of the public school interests of Indiana for the fifteen years ending Dec. 31, 1880:

Items.	1865.	1880.	Items.	1865.	1880.
Permanent school fund	$1,614,227.44	$ 9,085,254.72	Aver. length of school year	64 days	138 days
Value of school property	3,827,173.00	11,817,954.58	No. of teachers	9,628	13,576
Teachers' salaries	1,080,441.00	3,066,432.00	School houses	7,408	9,647
Average annual salary	107.28	221.41	School attendance	402,813	511,989

It will be observed that the permanent school fund has more than quintupled in this period; that the value of school property (considering the appreciation of the currency) has increased at full as great a ratio; and that, if the school enrollment has increased but twenty-six per cent., the average school year has considerably more than doubled in length, while it appears elsewhere that the average attendance has improved very materially. The total school population is 703,558; so that, adding to the school enrollment, 511,283, the 12,112 connected with private schools, and the attendance on seminaries and colleges, it is evident that more than seventy-five per cent. of the school population is in school.

Indiana expends three times as much for public schools as Virginia and West Virginia together. The State maintains a Normal school at Terre Haute, one of the most effective institutions of the kind in the West. There is a State University at Bloomington, well furnished with apparatus, having a valuable cabinet of mineralogical and geological specimens, and large collections in natural history. It had an attendance in 1880 of 397 students. At Lafayette there is an agricultural and industrial institution, Purdue University, endowed by the land grant act of 1862. It had 220 students in 1880. Besides these institutions, there are thirty-five denominational colleges and academies, and four professional schools, with an attendance of about 4,000 students. Illiteracy has been reduced very rapidly under the operation of the improved system of public schools and other causes, during the past ten years, so that the illiterates numbered, in 1880, less than one in eleven hundred of the entire population.* At the same time, the ratio of commitments for crime is below the average elsewhere; while the ratio of householders to the entire adult population is rather greater. Property is more evenly distributed in Indiana than is commonly the case in other States, which is attributed in part to the opportunities for work for all classes and the fewer inducements to speculation. A steady growth of manufactures and trade accounts for the much more rapid growth in population of the large towns and cities than that of the rural districts. For example, in the last decade sixty-three per cent. of the net increase of the population of fourteen central counties of the east half of the State was in the fifteen cities and large towns,

* Report of the State Superintendent for 1880.

Indianapolis being the chief. The population of Indiana has increased nearly 800,000 in the last ten years. The increase of agricultural wealth, as I have shown elsewhere, was in greater ratio than this. The manufacturing industries have grown with still greater rapidity. The number of miles of railroad has doubled since 1865. Within ten years, the product of the coal mines has very much more than doubled. The public debt has been reduced until it is now scarcely a million, after deducting its non-negotiable bonds, representing the funds it holds for the benefit of its own schools and colleges. Taxation, except for recent public improvements, is a mere trifle. Public and private credit stands high. The public press was never before so strong in influence at home and abroad, and never exerted itself so beneficially for the public weal as it has done during the decade just concluded. By its enterprise, and the greater efforts made by the State itself, through its Bureau of Geology and Statistics, and other means, to disseminate information as to its resources and its civil and social advantages, these are better understood than at any former period in its history. As a consequence, home and foreign capital stands ready to embark in new enterprises or to enlarge existing industries. The advantages of homes in the midst of such privileges as we have described will prevent any considerable emigration, and will continue to attract immigration, especially to the industrial centres. With nearly half of her soil still unfurrowed, with her rich deposits of "block coal" of superior quality for smelting purposes barely broached, with a school fund larger in proportion to her population than any other State in the Union, with abundance of work and fair wages for all who come to her—Indiana enters upon a new decade confident of continued and increasing prosperity.

CHAPTER VI.

STATE OF ILLINOIS.

ILLINOIS, embosomed in the very midst of the luxuriant valley of the Mississippi, with a soil of unsurpassed fertility extending from boundary to boundary, with two-thirds of its surface underlaid with coal, with its broad expanse well-nigh girdled by navigable waters, traversed by the main channel between the twenty thousand navigable miles of the Mississippi river system and the five inland seas of the mighty St. Lawrence, and seamed in all directions with the trunk lines of the railway systems of the continent—naturally leads all the other States of the West in agriculture, manufactures, and commerce. The entire area of the State is 56,650* square miles, or 36,256,000 acres; being a sixth greater than the area of New York, and nearly equal to that of England and Wales combined. Yet, there is probably less than ten square miles of sterile land in all this broad territory. The extreme length of Illinois, measured nearly on the third principal meridian, is about 385 miles, extending from the Wisconsin line, under the parallel of 42° 30′, south to the confluence of the Ohio and the Mississippi, some two miles below the thirty-seventh parallel. Its greatest breadth, on the parallel of 40° 12′, is about 218 miles; that is, from the meridian of Vincennes, 87° 35′ to 91° 40′ west of Greenwich. The boundary of the State is very irregular, following, first, the tortuous windings of the Mississippi, its entire western and southwestern line (separating it from Iowa and Missouri), to Cairo, thence up the still more crooked Ohio, dividing it from Kentucky, to the mouth of the Wabash; which it ascends through all its frequent and abrupt windings to the meridian of Vincennes, the common boundary of Illinois and Indiana from this point to Lake Michigan, a distance of about 165 miles. From here the boundary follows the Lake to the Wisconsin line, the parallel of 42° 30′,

* According to statement of the United States Census Bureau.

along which it runs about 140 miles, to the Mississippi. It is a singular provision that, while the jurisdiction upon the Wabash and on the Mississippi is concurrent for the States separated by them, and while the middle of the Mississippi is expressly named as the boundary on that side, the fundamental law confines the jurisdiction of Illinois to the north shore of the Ohio, and gives her no control on that stream except as may be arranged between Illinois and Kentucky.

The surface of Illinois rises from the broad alluvial bottom lands of its rivers in steep, romantic cliffs, from one to four hundred feet in height (as in many places along the Ohio and Lower Mississippi), or, which is still more common, in beautifully rounded, grassy bluffs (as along the Illinois, the Sangamon, and Rock river). From the tops of these bluffs, extend the prairies, now clothed through all the summer with green or golden grain. There are no mountains in Illinois. Its highest summits are between Galena and Freeport, in the northwest corner of the State, near Scales' Mound. Some of these rise 648 feet above Lake Michigan, 873 feet above the Mississippi at Cairo, and 1,164 feet above tide level. Mounds are common in the prairies of Central Illinois, rising from fifty to seventy feet above the surrounding plains, crowned with groves, and looking, as viewed across the green billows of apparently illimitable corn fields, like mimic islands. Along the line of the rugged geological uplift, known as the Grand Chain, extending from Grand Tower on the Mississippi to Shawneetown on the Ohio, and below this, the country is quite broken, resembling Southern Indiana. The general slope of the State is from the northeast to the southwest, the prevailing direction of all its principal interior rivers, Rock river, the Illinois, the Sangamon, the Kaskaskia, and the Big Muddy. In all, there are 288 rivers and large creeks shown on the best maps, of which only the Illinois and the great boundary rivers are at present used to any noticeable degree for navigation. Rock river, the Pecatonica, one of its tributaries, the Fox, the Kaskaskia, the Vermillion, the Sangamon, the Kankakee, and the Embarras might easily be rendered navigable by slack-water improvements, and it is not unlikely that the Kankakee may be so improved and be connected with the Maumee, at Fort Wayne, by canal. The subject is now receiving legislative attention. After leaving the northwest part of the State, where the fall gives good

water power, the streams become, for the most part, more sluggish, more dependent on the immediate rainfall, fluctuating greatly according to the season.

In every nook and corner of the State the soil has been put to the test of repeated crops, and has proved its fertility by harvests which have placed Illinois foremost among the wheat and corn growing States. In the bottom lands, the soil is alluvial, of a depth varying from five to twenty feet, yielding crops in almost marvelous profusion. The "American bottom," extending for a hundred miles along the Illinois side of the Mississippi, with an average breadth of seven miles, fully justifies this expression, yielding at times eighty bushels of corn to the acre. The bottom lands of the Illinois are nearly as broad as those of the Upper Mississippi, say from one to three miles wide, and are of inexhaustible richness, although scarcely equal to the American bottom. The uplands from Lake Michigan to the Grand Chain are covered with deposits of drift, varying from ten to two hundred feet in depth, overlaid with rich black loam, from ten to fifty inches thick. The finely comminuted limestones, sandstones, and shales of the drift era, mingled with organic vegetable and animal mould left by the dead herds and unmown harvests of countless centuries, constitute here a strong soil, distributed with peculiar impartiality over every section of the country; so that when the several counties are marked on the map, as I have just marked them, for every 10,000 hogs and cattle, every 2,000 acres in orchards, and every 100,000 bushels of wheat and corn produced, not one of the 102 counties goes unmarked for corn, of which only twenty-eight counties produced less than 1,000,000 bushels, and but four less than 500,000 bushels; only twenty-eight counties show less than 100,000 bushels of wheat, while twelve show from ten to thirty-three hundred thousand bushels; only eight counties show less than 10,000 hogs and 10,000 cattle; while in each section, north, south, east, west, and in the central counties, the number of hogs assessed range from 10,000 to 70,000, and the cattle from 10,000 to 41,000 and upward. The maps of other States marked on this plan show a much more unequal distribution of the principal crops, while some of them betray large districts as yet but little cultivated.

The northern part of Illinois is of the Silurian formation, the Lower Silurian immediately underlying the northwestern, and

the Upper Silurian, the northeastern portion. South of a line drawn eastward from the mouth of Rock river to within a few miles of the Indiana line, the formation is mainly Carboniferous, and coal is now mined in numerous places over most of that area, embracing about three-fourths of the entire State. Professor Worthen, the State geologist, estimates the extent of the Illinois coal field at 36,800 square miles. Occasional outcrops of older formations occur, where geological uplifts have brought the lower strata to the surface. There is a narrow strip along the Ohio and the Mississippi rivers, from the mouth of the Wabash up to the northern line of the coal field, in which, except where it crosses Madison county, opposite the great east bend of the Mississippi, there is no coal. The Belleville mining district, within sight of St. Louis, is the most productive and valuable mining region of the State. The Coal Measures, which thin out toward the north and the west, entirely disappearing before reaching Lake Michigan and the edge of the great trans-Missouri plains, range from a depth of over 500 feet above the conglomerate formation in Southern Illinois, to but a few feet in the north. There are six principal seams of workable coal. Beginning with the lowest of these, No. 1 ranges from two to three feet in thickness. No. 2 varies from two to five feet in thickness. It is the lower seam at Murphysboro, the Morris coal of Grundy county, the lowest seam at La Salle, between the above places, and the lowest coal at the Pontiac shaft. No. 3 is from three to four feet thick. No. 4 is a coal that has only been identified at Cuba, in Fulton county. No. 5 is one of the most persistent seams, and is almost universally developed wherever properly sought. It produces coal of excellent quality; that raised at Howlett, Sangamon county, being pure enough to be used without coking for iron smelting. No. 6 is the highest seam in Illinois that attains a thickness of more than two feet. It is from four to five feet thick in La Salle, Fulton, and Peoria counties, and from six to seven feet at Belleville. The quality of the coal mined on the Big Muddy is not equal to that of the Indiana and Ohio block coals, but it is regarded as a block coal, and is used without coking, in large quantities, for smelting the Iron Mountain and other Missouri ores, to which it lies almost adjacent. The coal mined in Illinois, in 1869, amounted to 2,629,563 tons. The product had increased in 1879 to 8,500,000 tons; three and a half times the amount in any other

Western State, except Ohio, of which the yield that year was estimated to be 5,000,000 tons. It is estimated that Illinois contains one-seventh of all the known coal in North America. This enormous treasure is greatly enhanced in value by its close vicinity to the inexhaustible mountains of the finest iron ore in the world for the manufacture of steel, in Missouri; by cheap river and lake transportation, bringing it nearer than any other great coal region to the rich iron and copper ores of the Upper Peninsula of Michigan; and by its nearness to the two grand commercial and manufacturing centers of the Central States, Chicago and St. Louis. The quality of the Illinois coal is not equal to that of the bituminous coal of Eastern Ohio and Western Pennsylvania; but the immense quantities of it, its wide distribution over a prairie State which is at the same time rising into high rank as a manufacturing region, the moderate depth at which the coal is reached, and the ease with which it is mined, the many railroads crossing the vast coal fields in every direction, and finally the neighborhood of the great cities, above named, the largest of the Mississippi valley, close upon the edge of the mining districts—all help to render coal mining an industry of great importance to this State. Mr. James McFarlane says: "There is, perhaps, no other area of equal extent in the United States where coal is so easily obtained with a moderate expenditure of capital as in the Illinois coal field." He also says: "It is remarkable that the first discovery of coal in America, of which there is any account in a printed book, was made so far in the interior as Illinois, by Father Hennepin, in 1660, more than two hundred years ago." Hennepin's map, accompanying his journal published in 1698, locates a "coal mine" near Ottawa, which evidently refers to the thin surface outcrop in that vicinity. "This," says R. C. Taylor, "is the earliest notice on record of the existence of coal in America." Devonian rocks crop out near the mouth of Rock river and in the forks of the Mississippi and the Illinois, and a few miles north of the mouth of the Ohio. The limestones of the Lower Silurian furnish building stones varying considerably in quality. On Fox river and along the Des Plaines, Upper Silurian limestone of superior quality is quarried, of which many of the most expensive public and private edifices in Chicago are constructed, including the magnificent County Court House. Much of this stone is shipped to great distances. The Carboniferous limestones are

accessible in many parts of the State. Silurian sandstones along the Upper Illinois river furnish material for extensive glass works. Carboniferous sandstones form a ridge in Union county, which contains also Lower Silurian and Devonian strata. Potter's clay is abundant in many localities, especially in the southern counties, where also ochres of value for mineral paint occur. Peat beds exist in swampy parts of several northern counties. Iron ores exist in many places, but not in quantities and of a quality to be of important commercial value while such exhaustless masses are so convenient in adjacent States. Lead occurs in Jo Daviess county, in the Galena limestone, in great richness, and has been worked here from early times. Mines have also been worked in Hardin and adjacent counties at the extreme south. Zinc ores accompany the lead, and of late years have become valuable. In the early settlement of the State, springs and wells furnished an important supply of salt. A few thousand bushels are still annually made in Saline and Gallatin counties, where seventy-five gallons of brine will make fifty pounds of salt. A superficial drift formation occurs over much of the State, carrying granite pebble and stray copper almost to the Ohio river. Mineral springs of various character occur in Southern Illinois, some of which have attained a local celebrity. Upon the central prairies, water is usually readily obtained by digging from twenty to fifty feet, but in extreme drought the supply is sometimes unreliable, and no reasonable depth of digging or boring promises a complete remedy. A tenacious subsoil, underlying a large proportion of the State, retains moisture until remedied by drainage, which is, fortunately, easily secured.

While Illinois is emphatically a prairie State, it has never been so nearly treeless as the States beyond the Missouri. Large districts of Southern Illinois were originally densely wooded, and forest belts from three to thirty miles wide extended along the banks, and filled the areas between the forks, of rivers. In many sections large surfaces have been denuded of timber. The woodlands at this time, based on the observations of the State Horticultural Society and the Census returns, stand in about the following ratios to the entire area of the country: In the Fox river district, embracing twelve counties in the northeastern corner of the State, the acreage of woodland is about six per cent. of the whole; in the Rock river district, including eleven counties in the northwest, it is now a little more than eight per cent.;

in the Illinois river district, below Ottawa, extending across to the Mississippi, embracing twenty-one counties, it is not far from fifteen per cent.; east of this district, in the Grand Prairie district, including seventeen counties in East Central Illinois, it is about six per cent.; directly south of this, in the Centralia district, embracing seventeen counties, lying mainly between the Wabash river and the Illinois Central railroad, the woodland acreage rises to fully twenty-four per cent. of the entire area; in the Kaskaskia district, stretching eastward of this last to the Mississippi, including thirteen counties, it is twenty-one per cent.; and in the Grand Chain district, including the eleven counties in the extreme south, it is from twenty-five to twenty-seven per cent. Dr. George Vasey enumerates sixty-one species of native forest trees common to the whole State, six peculiar to the northern part, and fourteen peculiar to the southern part, to which three have since been added, making eighty-four in all.* Of these, the principal varieties are the oak, of which there are ten species; the ash, of which there are five species; the maple, of which there are three; the walnut, hickory, pecan, poplar, elm, hackberry, cottonwood and tulip tree. Of wild fruit trees, there are the wild plum, cherry, crab apple, mulberry, haw, and paw-paw. Sycamore, cypress, redbud, birch, beech, and sweet gum grow in the southern counties. Fully eighty million feet of pine lumber were sawed in 1880 in Illinois mills along the Mississippi, those of Rock Island and Moline leading all others, in the ratio of seven to one. The pine logs are all rafted to these mills from the Upper Mississippi. Large quantities of native logs are manufactured into lumber in the principal hardwood districts, amounting to several million feet annually, but I have no exact data before me. Black walnut and poplar logs are in great demand for furniture factories. Counties and towns are authorized to provide for the encouragement of tree planting, but no large tracts of planted trees are seen anywhere. Groves of a few acres beautify some of the largest farms. The State Agricultural College at Champaign has covered about forty acres of prairie with a thrifty growth of many species of forest trees, and has done much to encourage forestry by plainly showing what trees are best suited to the climate. In all parts of the State, the waysides are bordered with Osage orange or other hedge

* Davidson & Stuvé say there are ninety species; and Professor French, of the Southern Illinois Normal, has discovered other species.

trees, or are shaded with far-stretching rows of elm, maple, walnut, locust, or poplar trees; while over 290,000 acres of orchards go far towards replacing the leaf surface lost to the State by the destruction of native forests.

At its settlement, Illinois abounded in deer, and the French pioneers shot many a buffalo and elk before the demand for furs and peltries had tempted the Indians to slaughter the immense herds that once grazed on this side the Mississippi. Wild turkeys were abundant along the Sangamon and other streams of Southern and Central Illinois, where they fattened on the pecans and other wild nuts. A few wolves, foxes, and minks still prowl around sheep fields and farm houses; an occasional otter haunts the streams in the depths of the deepest woods; a few muskrats build their quaint huts in the swamps; skunks still infest the hazel thickets; rabbits or hares start out of the orchards and bound along the hedge rows; opossums and squirrels, and occasionally raccoons, invite the sportsman to the woods; and pouched gophers, ground-squirrels, and moles infest parks, orchards, and corn fields. The fauna mentioned in the chapter on Ohio, are, nearly all of them, common to Illinois and Indiana. The grouse, or prairie chicken, is not extinct, but the great flocks of thousands, mentioned in the early history of this State, will be seen here no more. Wild geese and ducks, that formerly nested within the State, now pass over it in limited numbers. Swans, pelicans, and other water-fowl are occasionally shot on their passage across the State. Myriads of pigeons still come and go in their semi-annual migrations. The peculiar haunts of wild animals are mostly broken up. Few species are as yet entirely extinct, but most of the representatives that remain are driven to the thickly wooded river bottoms. Formerly fish were abundant in nearly all the numerous streams of the State; but neglect in the structure of dams, and wholesale destruction by traps and nets and winter fishing, have greatly reduced the supply. Stringent laws have been enacted of late, and a commission is maintained to see that these acts are enforced, and to co-operate with the United States commissioner in propagating fish and stocking the rivers of the State. This board, consisting of N. K. Fairbank and S. P. Bartlett, of Chicago, and J. Smith Briggs, of Kankakee, have in one year's time rescued nearly 6,000,000 young native fish from the shallows where they were left by the receding of the spring floods, besides distributing

nearly 1,000 German carp to various ponds, and securing 1,000,000 wall-eyed pike for distribution this year. The trout and whitefish of Lake Michigan are superior food, particularly the latter; and constant efforts are made by the United States fish commission to obtain large numbers of eggs for distribution to all inland waters where it is thought that they will thrive. The fish of the Mississippi and its tributaries from Illinois are for the most part the same which are enumerated in the chapters on Missouri and Iowa.

The climate of this State is subject to many and sometimes sudden and great fluctuations of temperature, yet that it is remarkably favorable to agricultural pursuits and to health is attested by the crop reports from year to year and by the vital statistics. Of the finest winter and spring wheat belts of the continent, the one covers its southern central portions and the other edges into its northern counties; while it leads all the States in corn. The annual mean temperature runs from 52° in the farthest southern projection of the State to 48° in the northwest. During the hottest week of 1872 the mean temperature ranged from 85° on the lake shore to 90° at Springfield, and about 92° at Cairo. The mean temperature for the coldest week of the following winter was zero on a line from the southern extremity of Lake Michigan through Springfield to the Mississippi at a little above the mouth of the Illinois river. It fell to nearly 10° below zero at Galena, and rose to about 8° above at the mouth of the Ohio. The average annual rainfall for the State is about forty inches; the average in the northern counties being not far from thirty-six inches, and that of the most southern counties forty-two. With its undrained swamps and prairie sloughs, and the rank vegetation left on the ground to poison the air in its decay, it is not strange that in early days ague was a prevalent disease in many parts of the country, but particularly along the bottom lands. The advance of cultivation, with its road making and drainage, together with close pasturage, has reduced the cases of ague to about the average throughout the Northern States from Boston to the Mississippi. In an area west of the Des Plaines and the Illinois, extending to the Mississippi, the deaths from consumption, in the year tabulated in the statistical atlas of the United States (1872), ranged from fourteen to twenty in every hundred decedents. This was the case also in a small area around Cairo, and in another small district along the Indiana line

north of Vincennes. In the rest of the State, nearly two-thirds of the whole, the deaths from this cause ranged from fourteen down to five in a hundred decedents. Deaths from malarial diseases are few in the region west of the Des Plaines and the Illinois, where those from consumption were most numerous, averaging less than one in a hundred. This disease prevails most in the extreme south. Deaths from intestinal diseases occur in about the same ratio as in adjacent States, except in a limited area along the great rivers, where they are fewer. Enteric, cerebro-spinal, and typhus fevers carried off from two to nine of every hundred on the mortality lists. "Thirty in every thousand decedents had lived to between sixty and seventy years, sixteen to eighty years and upwards. The mortality in Chicago, 1879 to 1880, Oct. 31, was less than in most other large cities of the world, being 17.9 in every thousand population, against 18.8 in St. Louis, 20 in Boston, 23.4 in New York, 25.8 in Brooklyn, 18.3 in Philadelphia, 20.9 in Baltimore, 27.7 in New Orleans, 32.9 in Dublin, 21.9 in Glasgow, 21 in London, 24 in Paris, 27.7 in Lyons, and 29.8 in Berlin." * Blindness, deaf-mutism, and insanity occur about on the average of the whole country. Idiocy among young children is a little above the national average.

The first recorded visit of white men to Illinois was made by Marquette and Joliet in 1673. La Salle entered the Illinois river by the Kankakee branch in December, 1679, and explored it to its mouth in 1680, setting up the standard of France at Fort Creve Cœur, on the east bank of the river, just below the mouth of Lake Peoria. A map of Canada, or New France, published at Paris, 1703, by Guillaume De Lisle, of the Royal Academy of Sciences, "First Geographer to the King," represents Lake Michigan as "Lac des Illinois;" locates the "Chicagou" and the Illinois rivers; and indicates the lead mines about Galena and Dubuque as "Mine de Plomb." The Illinois and Chicago rivers soon became the channel of the French and Indian traffic between the Mississippi and the Lakes. As early as 1686, or sooner, Father Claude Jean Allouez entered upon missionary work at the Indian village of Kaskaskia, and about the same time Father Pinet formed a mission station at Cahokia, nearly opposite the site of St. Louis. Indian traders soon followed, and erected rude storehouses and stockades. Encour-

* Dr. Oscar C. DeWolf.

aged by M. Tonti, La Salle's lieutenant and successor, farmers and mechanics began to settle here, at the old village of Peoria, and about Fort St. Louis; but more particularly at Kaskaskia and Cahokia. The cultivation of the soil was commenced before the year 1700; dwellings, chapels, and school houses arose; and before 1712 these places had taken on the appearance of permanent civilized settlements. The "Company of the West" was organized in Paris soon after this, to settle the Mississippi valley, and Philip François Rinault, as principal agent, sailed from France in 1719, with some 200 mechanics and miners, stopped at the West Indies on his way, and purchased 500 negroes to work in "the mines," and reached Illinois before the close of that year. These were the first slaves introduced into Illinois, where slavery was legally established by decree of the French monarch soon after this. It is perhaps not strange, then, that notwithstanding the ordinance of 1787 prohibited slavery in any portion of the Northwest Territory, or States to be organized from it, Illinois did not wholly shake off slavery until after 1840. This company held large tracts of land in fee simple direct from the crown, of which the Indian title was extinguished; and grants of so many arpents* along the river front or highway, extending back in long, narrow strips, often to a mile or more in length, were granted to individual farmers. Before the American Revolution the greater part of the American bottom for a distance of thirty miles above Kaskaskia was covered with these grants and brought under cultivation. Wind, water, and horse mills were erected for flouring purposes, and considerable exports of flour were made to New Orleans, Mobile, and other places. With thousands of savages on all sides of them, these quiet, inoffensive missionaries, peasants, and fur traders dwelt here for nearly a century, enjoying an Hesperian Acadia, as regards all but the ravages of the swamp angel of the American bottom, which often desolated their homes. They were not remarkable for enterprise or energy, and had the West waited for such as they to develop it, it would still be a wilderness. This state of things continued until 1763, when Illinois, with all the rest of Canada, or New France, passed by treaty to Great Britain, with scarcely any sign of change as regarded the laws and customs of the colony, until the American Revolution. On the Fourth of July, 1778, General George

* The arpent is 11.87 rods.

Rogers Clarke, under commission of Patrick Henry, Governor of Virginia, surprised and captured the British forts of Kaskaskia and Cahokia. The French were easily persuaded to espouse the American cause, and, having taken the oath of allegiance, were ever after loyal to the Republic, although, on more than one occasion, they were sadly ill-treated by the poorly disciplined militia of Virginia, and their none too scrupulous commanders. Virginia sent two successive "County Lieutenants," or sub-governors, who governed all the settlements of the region between the Ohio and the Lakes, under the name of the "County of Illinois."* The subsequent cession to the United States of the claims of Virginia and Connecticut to this vast territory, the Indian wars in which Illinois was concerned in common with Ohio and Indiana, under the administrations of Governors St. Clair and Harrison, have been sufficiently touched upon elsewhere. In 1809, Illinois, after having been under the jurisdiction, successively, of the governments of Canada and Louisiana, Great Britain, Virginia, Ohio, and Indiana, was organized as a Territory, with Ninian Edwards as Governor. The war with Great Britain in 1812, incited the Indians to renewed hostilities, involving numerous savage outrages and murders, many of which were avenged in manner almost as savage. The treacherous massacre of the garrison of Fort Dearborn, Chicago, was an incident of that war, as was also the fight near Rock Island, in which Major (afterwards President) Zachary Taylor participated. Compared with the rate at which the younger Western States have grown in population since opened to settlement, the growth of Illinois was at first very slow. The total population in 1800, the French *habitans* all included, numbered only 2,458. During the next decade the increase was less than 10,000, composed mainly of accessions from Virginia, Kentucky, North Carolina, and other Southern States. The war of 1812–15 checked the rate of immigration for a time, just as it had begun to flow in freely; but, as soon as peace was secured, the influx of new settlers became much greater than ever before. It gathered still greater volume when the State was admitted to the Union, Dec. 3, 1818, and two years later the Census of 1820 showed more than four and a half times the population of 1810. Settlements were confined, for the

* One of these was Colonel John Todd, who, under date of Jan. 15, 1779, issued his proclamation concerning "the settlement of titles of lands on the borders of the rivers Mississippi, Ohio, Illinois, and Wabash," requiring all who claimed to have titles to lands in this county to produce evidences of the same to be duly recorded.

most part, to the borders of the Wabash, the Ohio, and the Mississippi, south of a line from Terre Haute to the mouth of the Illinois. About this time the influence of steamboat navigation began to be felt. A little later the lead mines about Galena (generally conceded to be the first explored in the United States) commenced to draw multitudes of adventurers to that corner of the State. Lead mining first attracted public attention in 1821. In 1825 the lead product was 664,530 pounds; in 1827, it was 5,182,180 pounds; in 1828, 11,115,810 pounds; and in 1829, 13,343,150 pounds. Prices having suddenly dropped far below ordinary rates, the product of 1830 fell off to 8,323,998 pounds. Lead mining has been an industry of the State ever since. Note the effects of all these causes on the Census. There was an increase of more than 100,000 between 1820 and 1830. The Black Hawk war, in 1831 to 1833, was the ultimate cause of the removal of the Sacs and Foxes, and the opening up of the lovely Rock River Valley. Between 1830 and 1840, Illinois gained nearly 420,000 inhabitants. The Mormons migrated from Missouri to Nauvoo, Illinois, in 1840. Their influence was morally pestilential, and they were expelled in 1844. The increase of population between 1840 and 1850 was something less than in the previous decade, but was still nearly 400,000. As early as 1816 the project for opening a canal from Lake Michigan to the Illinois river engaged the attention of Congress. Right of way was ceded by the Indians. Other grants were made by the general government after the Indian title to this part of the State had been extinguished. Canal commissioners were appointed by the State to survey the route, locate these lands, sell them, and take other steps in the prosecution of the work. A ship canal was projected on a grand scale. The commissioners platted the site of Chicago in 1829. Settlers and speculators flocked hither from all parts of the country, foreseeing that the then untenanted flats on either shore of the sluggish, insignificant-looking Chicago river, were destined to bear a great city. The sales mounted into hundreds of thousands of dollars in value. Legislative wrangling conspired with other causes to delay the work for years. At last ground was broken July 4, 1836. The State becoming financially embarrassed, other internal improvements were abandoned, and for a time work on the canal was suspended. Finally, the plan of the work was changed. The project for a ship canal was set

aside. A system of locks was adopted, and in 1848 the canal was completed on the plan upon which it is now operated. The effects of this and other internal improvements, combined with the expansion of commerce on the Lakes and on the Mississippi, within the next few years, were remarkable. Railway construction began in earnest. Soon the Illinois Central and other roads penetrated far into, and in some instances entirely across, the State. Immigration was stimulated by the land-grant railroads, as well as by the peculiar natural and other advantages of the country. As a result, the population increased more than 860,000 between 1850 and 1860. The following table shows the population of Illinois in decennial periods from 1800 to 1880:

Years.	White.	Colored.	Slaves.	Total Population.
1800	2,275	188	.....	2,458
1810	11,501*	781	168	12,282
1820	53,778	1,374	917	55,311
1830	155,061	2,384	747	157,445
1840	472,254	3,929	331	476,183
1850	846,034	5,436	.....	851,470
1860	1,704,291	7,628	.....	1,711,951
1870	2,511,096	28,763	.....	2,539,891
1880	3,032,174	46,245	.....	3,078,769

Agriculture engages more than one-fourth of the total population of the State; manufacturing, one-sixth; trade and transportation, less than one-sixth; personal service and the professions, about one-eighth; and two-fifths are in school—leaving but a small proportion of the people, young or old, unemployed. Average wages in 1880 for field hands and mechanics were as follows: Field hands, by the year, $22.11 per month, or with board, $14.99; harvest hands, transient, $1.73 per day without board; transient field hands, not harvesting, $1.11 without board; with board, 82 cts. Mechanics—Carpenters, $2.03; blacksmiths, $2.03; wheelwrights, $2.12; machinists, $2.25; shoemakers, $1.75—without board. Of the total area of Illinois (36,256,000 acres), 15,201,183 acres were planted in 1880,† in corn, wheat, oats, rye, barley, flax and hay; 476,000 were in other crops; 4,257,054 were in pastures; 3,708,367 acres were in woodlands; 272,127 were in city and village lots; leaving some 10,500,000 acres not covered in the Agricultural Report, of which about

* There are 49 persons, besides Indians not taxed, appearing in the total population, but not among white or colored.

† State Agricultural Report.

8,500,000 are improved. The corn crop of 1879* was 312,221,000 bushels, a gain of seventy-four per cent. in ten years; the wheat crop was 44,896,830 bushels—an increase of fifty-four per cent. (In 1880, it was 53,767,200 bushels, or over thirteen and a half million bushels more than the wheat crop of all the Middle States and New England together.) The yield of rye in 1879 was 4,050,000—an increase of 500 per cent. in ten years; while the oat crop showed a decrease of twenty-eight per cent., amounting to but 25,716,990 bushels. The barley yield was 1,270,500, or only 20,500 more than in 1869; the yield of buckwheat was 305,900—a gain of twenty-one per cent.; the tobacco crop reached 14,091,000 pounds—a slight falling off; the potato product was 10,822,800 bushels—an increase of forty-seven per cent.; and the hay crop fell from 2,800,000 tons to 2,456,000, but rose in 1880, according to the State Agricultural Report, to 3,486,584 tons. The principal cereal crops of Illinois in 1859, 1869, and 1879, as given in bushels in the Census tables of 1860, 1870, and 1880, were as follows:

Crops.	1859.	1869.	1879.
Wheat	23,837,023	90,128,405	51,110,502
Rye	951,281	2,456,578	3,121,785
Oats	15,220,629	45,290,851	63,189,200
Indian corn	115,174,777	129,921,395	335,792,481
Buckwheat	334,117	168,869	178,850
Barley	1,086,338	2,480,400	1,229,533
Totals	156,544,165	207,936,491	444,622,350

It is worthy of special note, that, according to this authority, the total cereal products of Illinois increased much more rapidly during the last decade than in the one immediately preceding; the increase between 1860 and 1870 being 33 per cent., while between 1870 and 1880 it was 114. The remarkable differences between the agricultural statistics of the Census Bureau and those of the Agricultural Bureau are referred to elsewhere.

The following table shows the annual yield of the principal crops of Illinois, as estimated by the Agricultural Bureau, averaged for five years—1875 to 1879 inclusive—together with the total annual value, the price per bushel, the yield per acre, and the value per acre, all averaged for the same period:

* United States Agricultural Bureau Reports.

Crops.	Total yield of crops of 1879 in bush's, pounds or tons.	Average annual yield in bushels, pounds, or tons for 5 yrs., ending 1879.	Avg. price per bushel, pound or ton for 5 years.	Average annual value of crops for 5 years ending with 1879.	Av'rge ann'l yield p'r acre fr 5 yrs. ending 1879.	Avg. ann'l value per acre for 5 yrs. ending 1879.
Indian corn	121,500,000	260,280,740	$ .31	$78,600,837	30	$ 9.08
Wheat	29,200,000	*32,051,366	.95	30,543,361	13.4	13.11
Rye	675,000	2,917,000	.57	1,601,083	16	9.19
Oats	35,726,000	57,233,088	.25	13,901,612	30.7	7.53
Barley	1,250,000	2,074,320	.65	1,329,689	20.7	14.09
Buckwheat	251,000	165,180	.76	121,497	16.1	11.25
Potatoes	7 500,000	11,915,000	.47	5,389,473	85	40.49
Tobacco	14,500,000	7,182,500	.58	888,800	632 lbs	85.38
Hay	2,800 000	3,333,160	7.71	23,806,223	1.41 T	10.31

In 1879, Illinois led all the other American States in the total yield of the four principal cereals, corn, wheat, rye, and oats; it stood fourth in buckwheat, and twelfth in barley and tobacco. As in other wheat-producing States, so in Illinois, there have been discouraging seasons, followed by years when the farmer turned to other crops and the average of wheat fell off; but of late, improved cultivation, good prices, and favorable seasons have led to much larger yields than ever before. The wheat crop of 1879, according to the State report,† was over eleven millions and a half greater than that of any previous year, yet the product of 1880 shows the enormous increase of nearly eight and a half millions. I shall find no better point than this for correcting an error that is sometimes made by those who look simply at the currency prices of farm products in former years, as compared with recent prices, and so greatly underestimate the actual amount received for these products at this time. For example, it was stated in one of the official reports of 1879, that, owing to the low average price—eighty-seven cents per bushel—the value of the wheat crop of that year, $39,936,639 in currency, would return the producer less than the crop of 1864, 1866, or 1867; the first of which was nearly twelve million, the next nearly seventeen, and the last more than seventeen million, bushels less in quantity than that of 1879, but produced, the first, $51,775,318, the next, $55,104,243, and the last, $55,160,000. But, then, it must be borne in mind, that the price per bushel in 1864 (that is, $1.55) was worth only thirty-eight and seven-tenths cents in gold; that of 1866, given as $1.93, was worth but sixty-

* This is but little more than 66 per cent. of the crop of 1879, and only 60 per cent. of that of 1880.

† Reports of State and United States statisticians seldom agree. Usually the State reports, based on assessors' returns, are below United States estimates. The cereal statistics of the Tenth Census sometimes differ materially from both of these reports. These disagreements are noticed more particularly elsewhere.

six cents; and that of 1867, say $1.97, was worth but seventy-one cents in gold, while the price realized in 1879—eighty-seven cents per bushel—was gold or its equivalent. This being taken into consideration, the true value of the crop of 1864 was but $19,929,536; that of 1866 was but $36,545,819; that of 1867 was but $39,480,000; while that of 1879 was $39,930,699. Consider, also, the great reduction in the price of everything the farmer consumes, and it is easy to see why he feels inspired to increase his acreage to the utmost.

The best wheat district is on the Mississippi, beginning a little above the mouth of the Illinois, extending below the mouth of the Kaskaskia, and reaching across the State towards the Wabash. Of the more than forty million bushels of winter wheat raised in 1879,* three-quarters were produced south of Pana, in Christian county, half of this south of the Ohio and Mississippi railroad. In 1880 Madison was the banner wheat-growing county, with the immense aggregate of 3,539,400 bushels; Montgomery followed with 3,326,664 bushels; and next came Macoupin and St. Clair, all in a cluster, with eight neighboring principal wheat-growing counties directly around them. Madison averaged twenty-five bushels per acre. The principal spring wheat counties are in the centre and northwestern parts of the State. Spring wheat is giving place to winter wheat. In only twelve counties did the former, in 1879, exceed 100,000 bushels. These were, Lee, 362,690; and Ogle, Livingston, Bureau, McDonough, Knox, La Salle, Woodford, Whiteside, Stephenson, and Carroll, with from 172,000 to 122,000 each. Corn does well in all the State, but is most prolific in the central and north central belt, above the principal winter wheat district and south of the parallel of Chicago, from Indiana to the Mississippi. It is lightest in the extreme northeast, southeast, and southwest corners. Oats are lightest in the central counties. The crop of 1880 reached 62,709,002 bushels, or five and one-half millions over the average of preceding five years. Tobacco culture is confined to the southern counties. Cotton was raised for home use by early settlers as far north as the Sangamon; but, except for the impetus given by the high prices of the war times, little would have been raised for market. A few thousand bales were produced during the war and immediately after it. Hay is a very important crop in the northern and north central parts of the State, in what I

* Report of State Board of Agriculture.

shall hereafter point out as the chief dairy district. Strawberries, raspberries, and grapes are raised almost everywhere. There are cherries in the north for home use, and some plums and pears. Blackberries and peaches are abundant in the south, where, at certain localities, great attention is paid to all these fruits for marketing. At Centralia and Cobden, on the Illinois Central railroad, strawberries are shipped by the carload in their season, and special trains carry them and the peaches to Chicago. The Alton peach district has long been famous for its superior fruit, and large shipments are made from here to the St. Louis and Chicago markets.

In 1879 the orchards covered 287,583 acres; the vineyards, 2,899; fruits and berries not included in orchards, 3,111. The orchard products in 1879, were 595,869 bushels of apples, 25,749 bushels of peaches (less than the twenty-fifth part of the crop of 1878), 6,134 bushels of pears (less than half the crop of the year before), and 326,323 gallons of wine (double the yield of the preceding year). The grape yield was 3,184,952 pounds. Berries and small fruits were valued at $185,488. An area of 17,883 acres of sorghum produced 1,309,400 gallons of syrup; 17,664 acres of broom corn produced 11,161,238 pounds; the products of 29,639 acres in crops not named were valued at half a million more; while timothy, clover, and other grass seeds reached nearly half a million bushels, and flaxseed went over 1,600,000 bushels. With only 153,464 bushels of grass seed, Illinois led all the other Western States in 1870, and, with but 280,043 bushels of flaxseed and 2,204,606 pounds of flax fibre, she ranked third among all the flax-raising States.

The first as a wheat and corn growing State, Illinois is conspicuous also for the immense numbers of its flocks and herds. It stands first among all the States in the number of its horses—1,078,000*—a gain of twenty-two per cent. in ten years; and next to Missouri and Texas in mules—133,900—an increase of forty-four per cent. in ten years. The number of milch cows is 695,400, an increase of only fifteen per cent. since 1870; but in oxen and other cattle it stands fourth, with 1,235,300, a decennial gain of twenty-six per cent. In the number of fat cattle marketed, it is particularly prominent. A part of the superabundance of the corn fields is converted into fat cattle, hogs, and sheep. While the 4,464,000 oxen and other cattle of Texas were valued at only $39,640,320,

* Report of Agricultural Bureau for 1880.

the 1,285,300 of Illinois were estimated at $26,052,477. The fat cattle sold in 1879 amounted to 409,982, worth $16,751,450. Sheep raising, for various reasons, is not flourishing as it did ten years ago. The number of sheep in 1880 was only 1,110,800, which is forty-four per cent. less than in 1870. The flocks kept now are raised for market. Where wool raising is the main return looked for, the cheap, wild pastures of the far West, now that the railways have reached them, will be found the best adapted to this industry. The ravages of dogs have had their share in driving the flocks out of this State; for, while the fat sheep sold in 1879 numbered 174,448, those killed by dogs numbered 27,338, or nearly a sixth as many. The wool clip of 1878 was 2,891,000 pounds; that of 1880 was about 3,000,000 pounds. The hogs in January, 1880, numbered 3,202,600, an increase of fifty per cent. since 1870. During the year no less than 2,193,487 were marketed, which, with the hogs remaining on farms, made an aggregate of 3,800,364. In 1878 the epidemic known as hog cholera, together with other diseases, carried off nearly a half-million head (474,758), valued at $1,438,589.* The same year its ravages in Iowa and other Western States were nearly or quite as disastrous. In 1879 the loss for Illinois, from this cause, was reduced to $588,487, and in 1880 it was inconsiderable, while the high prices maintained, rendering this one of the most productive of farm products, have induced increased attention to hog farming. Illinois farmers marketed 300,000 more fat hogs this year than in 1879. The following table shows the number of farm animals in Illinois, averaged for the five years ending January, 1880, with the average price per head, and the total value, averaged in like manner:

Farm Animals.	Number in February, 1870.	Number of farm animals averaged for the 5 years ending January, 1880.	Price per head averaged for the five years ending January, 1880.	Total annual value averaged for five years.
Horses	881,300	1,092,760	$ 54.27	$59,312,165
Mules	93,000	126,960	62.33	7,909,805
Oxen and other cattle	980,000	1,261,300	20.94	26,485,981
Milch cows	603,000	705,830	26.99	19,054,339
Sheep	1,995,000	1,205,560	2.43	1,934,730
Hogs	2,005,000	2,965,740	6.26	18,174,762
	6,557,300	7,358,040	.....	$132,881,722

*State Report. The losses suffered in 1877 and 1878 from hog cholera and other diseases will soon be more than compensated for, to the farmer and to the consumer, by the improvements induced by it in the care of herds.

For some years Illinois has stood at the head of the butter and cheese producing States of the West. The demand for milk and cream in and about the great cities of Chicago and St. Louis, and in the thirty-seven cities, besides Chicago, with a population of five to forty thousand inhabitants, has tended to check the rapid increase of butter and cheese making, while Iowa, Minnesota, and Wisconsin have of late made more rapid progress in this direction than ever before, Wisconsin taking the lead in cheese making, with a product in 1879 of over 16,000,000 pounds, and Iowa passing to the front the same year in butter making, with a product of 50,000,000 pounds; while Illinois, which produced over 28,000,000 pounds of butter in 1860, and 36,000,000 pounds in 1870, is reported as having sold but 25,028,225 pounds of butter in 1879. But then its cheese product rose from 1,661,703 pounds in 1870 to 6,618,212 pounds in 1879, and the milk sold rose to the grand aggregate of 96,659,854 gallons,* besides 230,499 gallons of cream—enabling this State to maintain still its pre-eminence in the West in dairy farming. Iowa passed Illinois during the decade in the number of milch cows, but not in the quality of the kine, nor in the management of them. A line passing eastward from the southeast corner of Iowa across the Illinois river, and then curved so as to strike the Indiana line fifty miles farther south, defines with general accuracy the southern limit of the principal dairy district of the State. Here creameries and cheese factories constitute a very important part of the agricultural equipment. But the boundaries of this district are continually extending. The attention given to the improvement of stock in this State is worthy of special mention. In the ninety county fairs of 1879 there were exhibited 1,291 different specimens of pure-bred short-horned cattle, nineteen pure Herefords, ninety-one pure Devons, forty-seven pure Holsteins, 337 Jerseys, and fifty-eight Ayrshires. There were also 334 thoroughbred horses, 998 roadsters, 471 Norman and French draft horses, and 378 Clydesdale and English draft horses. There were 303 pure-bred Cotswold sheep, 491 pure Leicester and other long-wool sheep, and 243 South-Downs, owned in different counties; also eighty-eight

* According to figures furnished by Mr. A. H. Wright, of Chicago, who has special facilities for obtaining statistics of this kind, the city of Chicago in 1880 consumed 10,780,815 gallons of milk; 5,158,440 of which were delivered by the Chicago & North-Western Railway; 1,075,894, by the Chicago, Burlington & Quincy; 1,405,528, by the Chicago, Milwaukee & St. Paul; 532,763, by the Chicago & Rock Island; 252,152, by the Chicago & St. Louis; 152,616, by the Illinois Central; and 11,744, by the Chicago & Eastern Illinois; while 2,146,063 gallons were delivered by the wagons from farms about the city. The above shows the direction from this city of the milk-producing districts.

Oxford and other Downs, 166 American merinos and 838 Spanish merinos, and other fine-wool sheep—all pure-bred stock. Finally, of pure-bred swine, there were 756 pure-bred Berkshires, 1,137 pure-bred Poland Chinas, 307 Chester Whites, sixty-eight Essex, fifty Suffolks, and five small Yorkshires. These animals are well distributed throughout the entire State, and serve to show the intelligent and enterprising character of the stock raisers of Illinois.

According to an estimate based on the returns of poultry and eggs sold in nine representative counties, the amount of these marketed in the entire State was $8,466,000, which, added to the home consumption, would make the value of the total product not less than $6,000,000. Bee farming has not received the attention it deserves, and is destined to receive as soon as farmers and horticulturists learn the importance of combining this with their other interests. The honey produced in 1880 is variously estimated at from 1,700,000 to 1.900,000 pounds, and the beeswax at about 100,000 pounds.

The total values of the farm products of such a State as Illinois in a single year scale up into numbers that are really grand. According to the estimate of Secretary Fisher, of the State Board of Agriculture, the corn, wheat, oats, rye, and barley produced in 1880 reached a total of 373,649,888 bushels, worth $145,186,736; the hay and potatoes were valued at $26,278,089 more; the orchard products, at $8,176,480; the horses, cattle, sheep, and hogs, at $50,182,654; and the dairy products, at $27,000,000. Adding $6,000,000 for poultry and eggs, $450,000 for honey and wax, and about $6,000,000 for the buckwheat, hemp, flax, broom corn, tobacco, sorghum, grass seeds, beans, peas, roots, and other farm and garden produce, covering fully 500,000 acres, we have a grand total of more than $269,000,000, gold, as the value of the farm products of Illinois in 1880. The prices of farms vary, according to the quality of the land, the state of improvement, and the nearness to railroads and markets, from $15 to $75 per acre. The latter price attaches only to farms in the highest state of improvement near Chicago: Fifty dollars an acre will purchase as good wheat and stock farms as there are in the State, and farms capable of being made quite as productive can be purchased in Southern Illinois, at short distances from railway stations, at $25 and $30 per acre. The fine crops of wheat and the prevailing prices are leading

to the clearing off of timber in Southern Illinois, where uncultivated lands can be had for from $5 to $10 per acre. The average value of cleared and improved lands throughout the State is $33 per acre; that of good timber, $23.62. The advance in price of lands actually sold during 1880 was eleven per cent.. Farmers of large capital are coming hither from the older States and from Europe. Young men of energy, well trained in farming, take farms to cultivate on shares, and finally become purchasers. The area of cultivated lands is continually extending. The actual value of the farms of the State, with their tenements, farm implements, and machinery of all kinds, has already exceeded the first billion, and there is probably nothing to prevent its rolling over the bounds of another within the next decade, or at least before the close of the century. Until within a few years farmers have relied almost solely upon the natural fertility of the soil, and have done little to improve that condition. Farming as a science and an art is now engaging many of the finest intellects in the country. The results appear in the increased average yield of wheat and corn. The use of drain tile in certain parts of the State has grown with remarkable rapidity. In 1876 the manufacture of tile in Illinois aggregated only 4,684,853 running feet; in 1877 it reached 14,012,903 feet; in 1879, 33,059,616 feet. The introduction of fertilizers has hardly commenced as yet. Improved farm implements and machinery have added millions to the farm products of the State, but no one will believe that invention has consummated its improvements. The doubling of the farm products of Illinois is, therefore, entirely within the range of probability.

But, great as is the magnitude of this State's agricultural interests, they are now rivaled by its manufactures and commerce. The rate at which these have developed has of late even outstripped the increase of its farm products. Geographically and geologically considered, the State is most favorably situated for the indefinite continuance of this rapid industrial and commercial growth. In addition to its inexhaustible coal beds and the abundant crude materials of its own forests, fields, and mines, it possesses unrivaled advantages in geographical position and natural and artificial means of transportation for obtaining the rich iron, copper, lead, and silver ores of Michigan, Missouri, and Colorado, and the forest products of Michigan, Wisconsin, and Indiana; it has the grain and other farm

products to feed the workmen while they are manufacturing these materials; and it has the same means of transportation, together with the mercantile capital and combinations for distributing the manufactured goods. No revelation of the Census of 1880 will more strikingly impress the nation at large than the evidences of the westward migration of certain great industries, to which I give special consideration in another chapter. As shown there, Illinois has taken the lead in the manufacture of farm implements, in distilling and in certain other lines of production, and is following close after the old-time leaders of the Eastern States, in rolled, wrought, and cast iron. She now stands next to Pennsylvania in the number and product of her Bessemer steel establishments. Of every 100,000 rails of all kinds manufactured in the United States in 1878, Pennsylvania made 46,026; Illinois, 22,266; Ohio, 9,915; Wisconsin, 3,274; Indiana, 3,247; Kansas, 1,437; Colorado, 181; while Missouri (standing nineteenth) made but forty-one, and Michigan (twenty-first) but one.

In slaughtering and pork packing her pre-eminence is beyond all comparison, the product of Chicago alone, aggregating last year more than $81,000,000 in value. Men's clothing manufactured in Chicago exceeded $17,000,000, besides men's furnishing goods, hats, caps, and furs, boots and shoes, and millinery and ladies' wear, swelling the total to $30,000,000. Bridges, cars, and railway stock manufactured and repaired overran $8,000,000. Iron, rolled, cast, and wrought in the city, exceeded $15,600,000; the furniture, planing-mill, carriage, coopering, and other wood-working establishments, turned out products worth more than $21,000,000; while tanning and currying, and three other lines of factory work not hitherto named, each produced goods worth from five to six million dollars.

As nearly as can be determined at this writing, manufacturing and mechanical employments engage from one-sixth to one-fifth of the population. According to returns made to the Census Bureau for 1880, the greatest number of hands employed in these industries in Chicago alone was 110,819, while the three adjacent towns of Lake View, Lake, and Hyde Park, employed nearly three thousand more; and these figures are now known to be below the facts. According to the report here referred to, the number of manufacturing establishments in the city proper was only 3,683; whereas a report made in December following,

by four inspectors, appointed under the health ordinance for actual examination of all factories, work-shops, and other places where labor is employed *under roof*—returned 6,481 establishments, not including "home labor," such as the manufacturing of clothing, hosiery, and knit goods, carried on at the homes of the operatives for the large wholesale establishments. The list embraces only all places where the employes congregate to perform their labor by the day or week. By far the greater part of the increase of population in this State since 1870 is found in the cities and manufacturing and mining towns, nearly forty per cent. of it being in Chicago and its immediate suburbs. Of the thirty-seven cities outside of Chicago having a population of 5,000 and over, Peoria* manufactured goods valued at $8,178,835; Quincy, to the sum of $15,966,000, and the other twenty-five averaged not far from $3,000,000 each.

Later and fuller statistics of manufactures in Illinois during the last census year are given in other chapters. Here I shall only point out the principal lines along which the mechanical energies of this State are displayed, and the prominent centres of manufacturing activity. Foremost in value among the manufactures of Illinois are its flouring and grist mill products. Flouring and grist mills, driven by water or steam, are found in almost every city, village and hamlet. Very few are the counties which produce less than two hundred dollars worth of flour a year, fewer, indeed, than the number producing from one to five million dollars worth each. Cook county, including Chicago, and St. Clair, Peoria, Madison, Washington, Randolph, Adams, Macoupin, Rock Island, McLean, Christian, Lee, Montgomery, Kane, Will, and Winnebago counties (representing nearly every section of the State) lead all the others in this industry, in about the order here given.

Next in value, undoubtedly, are the meats packed, and canned, rising far into the millions, and exceeding in this line of industry the product of any other equal area on the globe. Here Chicago stands without a peer. Within the State, outside of that city, stand Peoria, Alton, Quincy, and one or two other places, doing a pork and beef packing business that in former times would have seemed large, but which is now dwarfed by comparison with that of Chicago, Cincinnati and St. Louis to very inconsiderable proportions: so inevitably does the greater

* *Illinois Tradesman and Manufacturer* of Jan. 13, 1881. *Manufacturers' Exchange* of Feb., 1881.

market for pork and beef absorb the smaller ones. In the production of iron this State has risen to the fourth rank in the Union; Chicago and South Chicago rival Pittsburg. South of these, some forty miles, are the furnaces and rolling mills of Joliet, continually increasing their capacity and out put. Danville, on the eastern border of the State, in Vermillion county, Bloomington and Peoria, in the central section, Rock Island and Moline, Quincy and Alton on the western borders, along the Mississippi, and Cairo in the extreme south, are all, to a greater or less degree, producers of pig metal or rolled, forged, cast or wrought iron. The manufacture of agricultural implements in Chicago has grown to enormous proportions. Beyond this the principal centres of this industry are Rock Island county, with its two flourishing manufacturing cities, turning off plows and other farm tools to the value of several millions every year; Winnebago county, with several million dollars worth more; followed in importance by Madison, St. Clair, McLean, Knox, Tazewell and other counties, which count their annual products of this description by hundreds of thousands of dollars, each. In the manufacture of distilled liquors, Illinois leads all the other States, and Peoria leads all other cities, with Chicago immediately following. Malt and malt liquors constitute another important industry, carried on in many parts of the State, but chiefly in Chicago. The manufacture of men and boys' ready-made clothing and furnishing goods, which was, comparatively speaking, almost monopolized by the principal eastern cities until some fifteen or twenty years ago, has expanded in magnitude in this State, until now it engrosses many millions of capital, and the annual product runs beyond twenty million dollars in value. The manufacture of leather takes rank among the chief industries of the State. Will, Lake, Rock Island and Stephenson counties produce annually from $100,000 to $250,000 worth each, but about seven-eighths of the whole manufacture is in Chicago. The standard brands of Chicago tanners and curriers are known in all markets, and rated among the best. The product increases rapidly. In 1880, it was estimated at $5,637,000. As was said of ready-made clothing, so of boots and shoes, the West no longer relies almost entirely upon eastern factories for these goods. The home product of Illinois in 1880, amounted to about four million dollars in value. Women's straw goods, mil-

linery and other ladies' wear made the same year, was worth nearly five million dollars. The construction and repairing of bridges and railroad stock engages an army of mechanics, with large divisions quartered in many different places, the total product of their labor approximating thirteen million dollars in value: that of Chicago alone being estimated for the Tenth Census, by Mr. Charles Randolph, Secretary of the Chicago Board of Trade, assisted by able experts, at $8,032,398. Other great industries of the State are carriage and wagon making, to the value of about four million dollars; sash, doors and planed lumber, nearly twelve millions; furniture, over ten millions; linseed oil, white lead, paints, lead pipe, and shot, $5,295,144, in Chicago; publishing, about $5,500,000; lard oil, oleomargarine and stearine, over $7,000,000; rectifying and compounding spirits, about $6,500,000. Among the comparatively new industries is glass manufacture, for which the best of sand is found in La Salle and several other counties. Illinois holds the fourth rank in window glass, and the fifth in green glass. New industries are springing up continually as the native resources of the State become better understood, as the facilities of transportation continue to increase, as capital and skilled labor pour in, and home wealth, outgrowing the requirements of agriculture, seeks other employment; so that already Illinois is almost as much a manufacturing as it is an agricultural State.

The commerce of Illinois is by no means confined to Chicago; each of its principal cities and towns carries on more or less trade directly with the commercial centres of the neighboring States, several of them conducting considerable transactions with the great Eastern shipping ports direct. Conspicuous among these are Peoria, Quincy, Bloomington, and Springfield. The enormous commerce of Chicago will be described elsewhere. Its proportions may be surmised from the fact that in 1880 the total transactions of the Chicago clearing house aggregated $1,725,684,898—or over one hundred million dollars more than double the sum in 1870. The flour (reduced to bushels), with other kinds of grain received here, amounted to 165,014,008 bushels; grass and other seeds, to 245,997,334 bushels; the canned meats, to 165,331,511 pounds; lard, to 68,481,193 pounds; tallow, to 18,620,419 pounds; live hogs, to 7,066,144; cattle, to 1,385,346; sheep, to 335,770; hides, to 71,810,334 pounds; wool, to 40,253,385 pounds; potatoes, to 1,998,845 bushels; coal, to 2,674,758 tons;

lumber, to 1,556,134,000 feet; shingles, to 652,547,000; highwines, to 17,095 barrels; salt, to 1,169,119 barrels. Fruits and other products of the country, seeking a market here, added many millions to the receipts above named; which, together with the annual manufactures of this city, overrunning $268,000,000 in value, and the mercantile trade in all kinds of imported goods, swell the sum total of Chicago's commerce to colossal proportions.

Without superior natural and artificial channels of transportation, such agricultural, manufacturing, and commercial development as I have already outlined in this chapter, would be simply impossible; and such channels of domestic and inter-State commerce Illinois enjoys to a pre-eminent degree. Passing the common roads, free gravel roads, and turnpikes of the State with the simple remark, that the former measure about 70,000 miles, in good condition most of the year, and the latter, some 2,500 miles, let us contemplate the navigation system of Illinois. The navigable boundary rivers of the State and its lake coast, together with the Illinois and Chicago rivers, linked by the Illinois and Michigan canal, measure about 1,500 miles, bringing her into water communication with the four quarters of the Union, and wedding the Atlantic and the Gulf inside her own thresholds. True, this union is not so complete as it should be, and as I must believe it is destined to become, so soon as the importance of perfecting it as a medium of cheap transportation and a means of controlling railway monopolies is fully realized. Discussion of the military, economical, and commercial advantages of a canal capable of passing large vessels from the Mississippi to the Lakes has agitated the leading minds of this country from the earliest period of our history. Indeed, this grand conception first took birth in the brain of that brilliant adventurer, Chevalier La Salle, when, after penetrating a thousand miles beyond the border tents of the Atlantic and St. Lawrence pioneers, he floated in his birchen canoe on a spring flood, from the wigwams of the good chief Chicagou, on the edge of Lake Michigan, into the Des Plaines, and down it into the "River of the Illini," from which he finally entered the Mississippi. The far-seeing prescience of this statesman *voyageur* predicted a grand Western empire stretching from the mouth of the Mississippi to the mouth of the St. Lawrence, and westward to the Pacific. To the founder (as he regarded himself) of such

an empire, the construction of a ship canal from the lakes to the navigable waters of the Illinois river, seemed a military and commercial necessity not long to be deferred. The empire that La Salle saw in vision is now a reality, only the "Stars and Stripes," and not the beloved standard of France, that he planted here, float over it, while the canal, compared with what it should be, is still but a trace better than a dream. That his vision of it will yet be realized, I will not permit myself to doubt. The general government has already effected such improvement as secures seven feet depth at all seasons, through more than a third of the upper reaches of the Illinois river, and is going forward to complete the work through the entire length. The city of Chicago a few years ago deepened the canal from the Illinois to the Chicago river, reversing the course of the latter, so that now Lake Michigan empties at one end into the St. Lawrence and at the other into the Mississippi. The removal of 13,000,000 cubic yards* of earth and 2,000,000 cubic yards of rock is all, then, that remains to be accomplished, in addition to what the government has already undertaken, to secure "a reliable seven-foot navigation" from St. Louis to Chicago, "capable of passing the largest commercial, military, and naval vessels now using the Upper Mississippi to the harbor of Chicago." The total cost of this deepening and broadening of the canal, as estimated by the government engineers, is $13,344,720. The British government has constructed canals past all the obstructions of the St. Lawrence between Lake Erie and the ocean, so that, when improvements now going forward are completed, vessels of heavy burthen can pass freely between Chicago and the Atlantic ports of Europe and America. To appreciate to some degree the grandeur of such a union as the ship canal here advocated would effect, it is only necessary to add to the 3,087 American sailing vessels, steam vessels, canal boats, and barges, of 597,577 tons burthen, navigating the Northern Lakes, and the 2,576 steam vessels and barges, of 501,809 tons, on Western rivers, the immense tonnage of British vessels on the Upper and Lower Lakes and the St. Lawrence, and endeavor to conceive of the almost incalculable carrying capacity of these craft in ceaseless motion for from nine to twelve months of every year. The total "arrivals" at Chicago in the single month of June, 1879, were 1,702, of 537,082 tons

* Report of Government Commission.

burthen; and the clearances, 1,716, of 551,285 tons—an increase in the arrivals of 435, and in the clearances of 411, for that month, in a single year. The port of New York did not have as many arrivals and clearances the same month, nor did their aggregate tonnage equal that above given for Chicago.

The following statement, compiled from the Chicago Board of Trade report of the number and tonnage of vessels which arrived at or cleared from the district of Chicago in the years 1870 and 1880, expresses most forcibly the magnitude of Chicago's lake traffic, and of its steady growth notwithstanding the marvelous increase of railroad transportation during the same period:

	Vessels in the Coast Trade.		Foreign Vessels from or to Foreign Ports.		Am. Vessels from or to Foreign Ports.		Total for 1880.		Total for 1870.	
	No.	Tonnage.	No.	Tonnage	No.	Ton'gs.	No. Vessels	Tonnage.	No. Vessels	Tonnage.
Arrived....	12,795	4,468,350	353	133,963	70	19,657	13,218	4,616,969	12,739	3,049,265
Cleared....	12,886	4,373,478	360	184,938	106	29,971	13,302	4,587,382	12,438	2,963,942

The grain sent East by the Lakes in 1880 amounted to 92,000,000 bushels, as against 46,000,000 bushels sent by rail; the shipments of grass and flax seed by lake amounted to over 107,000,000 pounds; the animal products, to about 123,000,000 pounds, besides more than 85,000 barrels of beef and pork; while the lumber received by the Lakes reached nearly a billion and a half feet; the shingles, over 585,000; the lath, over 55,000,000; and the packages of merchandise, 3,984,362. The traffic by canal and at the various river ports amounts to several hundred thousand tons per annum.

But it is since the advent of railroads that Illinois has made the most surprising progress. Grading for several railroads was commenced as early as 1837, but the collapse of the absurd internal improvement scheme then inaugurated put an end to the work in its incipiency. A section of the Northern Cross Railroad* was opened from Springfield to Meredosia in 1838, and operated with steam, but at a loss. The locomotive gave place to mules, and soon the road fell into disuse. Not until its reconstruction and the building of the Galena & Chicago Union Railroad were began in 1848, and the Michigan

* Now a portion of the Wabash, St. Louis & Pacific. The Galena & Chicago Union Railroad, chartered in 1836, was completed to Harlem 10 miles, in 1848, to Elgin in 1850, and to Rockford in 1852.

Central reached Chicago soon after, was the era of railroads in this State fairly ushered in. With such rapidity were they extended that in 1865 Illinois had outstripped all the other States but Pennsylvania in railroad mileage, having 3,157 miles; in 1870 it had 4,823 miles, having left even Pennsylvania, with her 4,656 miles, behind. In 1880, it has 7,914.61 miles, exceeding the mileage of all New England by nearly 2,000 miles, that of Ohio and New York by about the same distance, and that of Pennsylvania by about 1,700 miles. There are now but four counties in the State untouched by railroads, and three of these lie in a cluster on the Ohio river, just below the Wabash. There are thirteen railroads (nine of which are terminal in Chicago) whose freight earnings in 1879 amounted to about one-fourth of the total railroad freight earnings in the United States. The tonnage movement of these roads in 1879 was 67,092,549, as against 45,557,012 tons in 1873. To obtain a correct idea of the magnitude of these railway systems of Illinois, it would be necessary to follow these great trunk lines far beyond the limits of the State, and note their rapid extensions and improvements. This will be attempted in the chapter on railroads, further along in the volume. Of the seventy-six railroads in the State in 1879,* twenty-three reported 11,340,959 passengers, and 21,127,642 tons of freight carried. The capital stock of the seventy-six roads amounted to $425,065,679, equal to about one-fourth of the National debt; the cost of these roads and their equipments was $391,223,946; the gross earnings that year were $63,662,565; and the net earnings were $30,255,551, out of which $14,953,932 were paid as interest on bonds, and $10,032,571 as dividends on stock.

Under the mania for internal improvements, in 1837, the State finances became much embarrassed. Repudiation seemed imminent. Better counsels prevailed, and the public credit gradually grew sound. When the first great congressional land grant for railway construction was transferred to the Illinois Central Railroad Company, it was stipulated that it should pay the State perpetually seven per cent. of its gross earnings. This amounts now to almost a half-million annually. At the close of 1880, the entire State debt was practically wiped out—putting Iowa and Illinois in a like enviable prominence before the nation and the world. The annual revenue from the last-named source

* Poor's Manual for 1880.

will go henceforward to reduce taxation for State purposes. Local municipal debts are hardly in so favorable a form. Under the local option style of legislation, counties, cities, and towns were permitted to tax themselves or to issue bonds for almost any form of public works which they flattered themselves would be desirable. Bridges, public buildings, and other structures necessary, were put up in extravagant style, at extravagant cost, in the full flow of money after the war. Railroads received a great impetus through such subscriptions. Local indebtedness assumed threatening proportions, leading to an absolute prohibition of municipal railroad subscriptions by the constitution of 1870, and to the limitation of indebtedness to be incurred by any municipality. Under these provisions local indebtedness is diminishing. The following table shows the local indebtedness of the State:

Total county debt	$15,296,888
Total township debt	10,165,775
Debt of cities, villages, and towns	28,829,413
Debt of school districts (1880)	3,406,804
Total	$59,699,879

The assessed value of property in Illinois, according to the returns of 1880, was $786,616,394; the true value is not less than $1,500,000,000. The property is listed as follows:

Lands	$391,896,600
Town and city lots	184,044,453
Personal property	164,894,066
Railroads	44,601,815
Capital stock of corporations	2,179,460
Total	$786,616,394

The State tax for school purposes in 1880 aggregated $1,013,071, and the special taxes raised for the same purposes amounted to $5,735,477. The total assessed value of property in the twenty-two cities of the State, having a population of 7,500 and upwards, was, according to the Tenth Census, $176,210,896, and the total tax levy for the same cities, $7,122,741. The bonded debt of these places is returned as follows:

Alton	$ 112,850	Jacksonville	$ 254,000
Aurora	20,000	Joliet	54,000
Belleville	222,300	La Salle	36,000
Bloomington	207,500	Moline	37,500
Cairo	270,000	Ottawa	60,000
Chicago	13,043,000	Peoria	696,500
Decatur		Quincy	1,898,700
Danville	85,000	Rockford	175,000
East St. Louis	272,800	Rock Island	280,000
Elgin	30,000	Springfield	778,780
Freeport	23,500		
Galesburg	53,250	Total	$18,590,680

This debt was created for the following purposes:

Bridges	$ 71,500	Refunding old debt	$ 2,908,680
Cemeteries	26,000	Schools and libraries	1,446,250
Fire department	58,800	Sewers	2,697,980
Funding floating debt	1,008,800	Streets	760,700
Improvement of harbors, rivers, and water power	2,707,000	Unspecified	74,000
Parks and public places	146,000	War expenses	42,000
Public buildings	737,000	Water works	5,604,500
Railroad and other aid	876,500	Total	$18,590,680

A glance at the subjoined exhibit will show when these bonds were issued and the dates of their maturity:

Amounts of Bonded Debt Issued in Years Named.		Amounts of Bonded Debt Maturing in Years Named.	
Previous to 1860	$1,572,200	Overdue	$ 121,747
1860	13,000	1880	990,210
1861	846,500	1881	996,760
1862	.....	1882	456,735
1863	493,000	1883	108,800
1864	269,000	1884	582,885
1865	622,000	1885	230,034
1866	610,250	1886	651,559
1867	2,168,640	1887	668,300
1868	1,994,800	1888	1,888,300
1869	2,771,340	1889	867,900
1870	3,934,200	1890	1,637,700
1871	301,600	1891	330,300
1872	186,400	1892	1,638,100
1873	195,450	1893	528,500
1874	285,700	1894	1,785,500
1875	555,366	1895	2,967,000
1876	451,809	1896	402,500
1877	560,000	1897	563,100
1878	531,025	1898	1,087,000
1879	172,645	1899	1,069,000
1880	48,500	1900	103,000
Unspecified	17,255	After 1900	.....
Total	$18,590,680	Total	$18,590,680

It will be interesting to note in the following statement the rates of interest these bonds draw:

AMOUNTS OF BONDED DEBT DRAWING RATES OF INTEREST NAMED.

10 Per cent	$ 715,180	6 Per cent	$ 3,818,880
9 " "	5,000	5 " "	17,545
8 " "	1,471,525		
7 " "	13,562,600	Total	$18,590,680

The total debt of each of these cities, after adding the floating debt, appears in the table below, together with the total tax levy, total assessed value of real estate and personal property,

total estimated true value, and the population at the last three decennial periods:

Cities.	Popul'n 1880.	Popul'n 1870.	Popul'n 1860.	Total Assessed Value of Real and Personal Property.	True Value of Real Estate.	Total Estimated True Value of Real and Personal Property.	Taxation. Total 1877	Total Debt.
Alton	6,235	5,005	9,631	$ 1,204,700	$ 2,901,575	$ 5,902,100	$ 73,000	$ 112,000
Aurora	9,611	11,169	11,845	3,008,704	5,091,70	6,799,200	98,444	85,000
Belleville	7,850	6,146	10,683	1,831,960	3,162,413	4,217,884	75,000	262,000
Bloomington	7,075	14,990	17,134	3,421,134	5,545,000	7,370,700	135,449	251,462
Cairo	9,190	6,267	9,554	1,623,634	2,480,050	2,494,200	61,000	270,000
Chicago	112,172	298,977	109,254	117,970,000	306,540,700	405,121,017	3,112,373	12,042,000
Decatur	3,000	7,161	3,540	1,661,206	5,285,714	7,447,612	74,000	66,000
Danville	1,000	4,751	7,730	2,080,000	3,511,111	4,951,451	54,643	66,000
East St. Louis	.....	5,844	9,185	3,109,734	6,712,180	9,960,000	74,554	273,000
Elgin	5,797	5,441	6,787	1,897,714	3,742,851	5,257,000	80,000	54,000
Freeport	5,370	7,000	9,510	1,800,000	3,110,316	4,140,000	54,546	60,000
Galesburg	4,000	10,180	11,443	3,708,681	7,416,700	9,888,916	78,654	53,000
Jacksonville	5,000	9,209	10,927	3,000,000	5,200,111	6,951,451	109,446	273,000
Joliet	7,105	7,000	14,146	2,894,913	5,277,000	7,516,044	96,000	44,000
La Salle	4,015	5,200	6,000	980,450	977,500	1,303,000	40,000	35,000
Moline	2,000	4,100	7,000	1,400,440	2,300,000	3,074,724	52,240	37,000
Ottawa	.....	7,700	7,000	1,544,000	2,477,000	3,300,000	52,000	60,000
Peoria	14,000	22,849	20,000	6,722,000	10,301,000	13,735,440	200,734	716,000
Quincy	13,718	24,000	27,270	6,427,997	15,470,000	20,625,340	302,000	1,017,000
Rockford	6,977	11,049	13,129	3,208,647	5,565,000	7,451,000	102,927	173,000
Rock Island	5,190	7,000	11,000	2,000,000	4,700,000	9,047,000	97,000	300,000
Springfield	9,250	17,364	19 746	4,731,000	8,000,000	11,114,000	115,000	775,000
Totals	227,761	505,000	770,944	$170,210,000	$413,075,000	$540,000,000	$7,100,000	$19,000,000

The true statesman, the lover of his country and his race, finds little gratification in contemplating such enormous aggregates of riches as in Illinois unless it appears upon analysis that it is, for the most part, happily distributed; so that none, or few, who are industrious and temperate, fail to enjoy the necessaries and plain comforts of life. The social statistics of Illinois are not nearly so full and accurate as they should be, but it is clear that beyond the purlieus of the large cities pauperism is rare. There are men here of princely fortunes, and corporations richer than all the golden sands of Pactolus, but, on the other hand, the number of farms compared with the population engaged in agricultural pursuits is larger than in most States. In the cities and villages the number of persons paying taxes on lots and dwellings is a much larger ratio of the whole population than in the older States. In 1870, the church sittings of the several denominations provided for only three-fifths of the population. In 1880, they provided for very nearly the entire population; the Methodists owning about one-fourth of them, the Presbyterians, Baptists, and Roman Catholics each about one-eighth, and other denominations the remainder.

In 1818, when Illinois was admitted to the Union, the general government gave three per cent. of the proceeds of public

land sales to the State for a school fund; one-sixth of this to be used exclusively for a college or university. One section of land in every township (the sixteenth) was given for the support of schools. One township was given for a seminary. Besides these funds, there is a sum of surplus revenue, distributed to the States in 1837, made by the State legislature part of the school fund, being $335,592.82. There is a county fund, created by legislative act of 1835, providing that teachers should not have over half their pay for the preceding year from public funds, and making the surplus a county fund. Besides the above, the State received land to the amount of 480,000 acres, under the act of 1862, to endow agricultural colleges. An annual tax of $1,000,000 is levied by the State for general distribution on the basis of the population under twenty-one years. The permanent school funds, of which the income alone can be expended, for public school purposes, are as follows: School fund proper, $613,363.96; surplus revenue, $335,592.32; college fund, $156,613.32; seminary fund, $59,838.72; county funds, $178,171.79; township funds, including school lands unsold, $7,705,722.95; Industrial University fund, $319,178.87; total, $9,368,480.93. In 1878, Illinois expended for public schools $7,526,109, or more than all the fourteen Southern States together, Maryland alone excepted. In 1880 the total receipts for school purposes reached $9,931,758.74, or about the same as the total public school expenditures of all the United States in 1850. According to the report of Hon. James P. Slade, State Superintendent of Public Instruction, the expenditures in 1880 amounted to $7,531,942.79. Of this, $6,679,701.67 was defrayed by State and local taxation, averaging for the whole State less than one cent, or eight and one-half mills, on the equalized assessed valuation of real and personal property. The estimated value of school property is $15,606,072 in buildings and grounds, $87,567 in libraries, and $181,927 in apparatus; while the total bonded school indebtedness outside of Cook county (having decreased nearly twenty-seven per cent. in ten years) is but $1,622,609.81, or only about one-fourth of one per cent. of the equalized valuation of 1880. The total school indebtedness of Cook county, $1,783,695, is due partly to the great fire of October 9, 1871, and partly to the rapid growth of the city. Of the 1,010,851 children of school age (six to twenty-one years), as enumerated by the school census, the whole number enrolled in the public schools was 704,041. Be-

sides this, there were 60,440 in private schools. The public and private school teachers numbered 28,750. The number of persons between twelve and twenty-one years of age returned in the school census as unable to read and write was only 4,045 from all causes: neglect of parents, poverty, muteness, feeble-mindedness and ill-health. County boards may appropriate a small sum each year to aid in defraying the expenses of county institutes, the main cost of which falls upon teachers and others in attendance. There are two finely equipped State Normal Schools, which are doing effective service, and, adjacent to one of these, is a State laboratory of natural history, ably conducted. The Illinois Industrial University at Urbana and Champaign, endowed by congressional land grant of 480,000 acres, hitherto referred to, and several hundred thousand acres donated by the citizens of Champaign county, is one of the most admirably planned, fully equipped, and successfully conducted of all the land-grant colleges of the Union. Each of the great denominations controls at least one college or female seminary, and some of them have several such institutions. In and near to Chicago are grouped fully a score of colleges, preparatory schools, ladies' seminaries, and professional schools. The attendance on these and other such institutions in the State, denominational and private, was over 60,000 in 1880. Its Board of Public Charities, fortunate in the choice of Mr. F. H. Wines as Secretary, a man of rare knowledge of this subject, and of remarkable administrative ability, has lifted Illinois above the average level of American States in the administration of charitable and penal institutions. The State supports four asylums for the insane, one for deaf mutes, one for the blind, a school for the feeble minded, a soldiers' orphans' home, and an eye and ear infirmary. Among penal establishments are two penitentiaries, constructed on the best models, and a so-called reform school, to which only convicted criminals can be sent, so that it might more fitly be called a juvenile penitentiary.

The public press of Illinois, secular and religious, is noted for its editorial sagacity, reportorial enterprise, and far-reaching influence. The great dailies of Chicago are unsurpassed in these respects in the United States. They have rendered incalculable service in publishing to the world the resources of the West, in attracting immigration and capital, in forming public sentiment, and in shaping local and national legislation. In the number of

its daily and weekly papers, this State ranks next after New York and Pennsylvania. It publishes 73 dailies, and in connection with these, 61 weeklies, 5 semi-weeklies, 5 tri-weeklies, and 15 Sunday papers, with an aggregate circulation of 118,114,023 copies* per annum; besides 654 other papers, of which, 592 are weeklies, 13 semi-weeklies, 1 tri-weekly, 3 bi-monthlies, 22 monthlies, and 11 quarterlies.†

Turn where one will, he sees in this State innumerable tokens of vigorous thrift, guided by intelligence, morality, and piety. Forests of sacred spires tower above its noisy trade marts, and village and hamlet steeples gleam across the prairies in every direction. The first indications of a village near at hand are the towers and roofs of churches and the cupola of the high school. Thousands of the cross-roads are marked by district school houses. Eleemosynary institutions stand open to receive all classes of unfortunates. The huts and log houses of the pioneers have given place, for the most part, to frame, brick, or stone dwellings. Hovels there are none. The garb of the humblest workman, the garments of his wife and children, the wholesome food upon his table, to one acquainted with the peasants and navvies of Europe, show a striking contrast of comfort here with pinching penury there. Hearing the hum and clangor of industry on every side, and inspired with the cheerful activity of the population, young and old, the traveler exclaims at heart with Dean Stanley: "Here is the marked peculiarity of the American people—the singular buoyancy and elasticity both of the national and individual character. It may be the product of their brilliant, exhilarating, invigorating climate; it may be the accompaniment of the vast horizon opened out by their boundless territory; it may be partly the youth of the nation, but its existence is unquestionable." Industry is stimulated by ownership to a much greater degree than in the older States, and its transforming hand works wonders on every side. But all that exists now must be regarded as but the prologue to the drama of the future. Large as was the wheat product of Illinois last year, the area sown in that grain was less than the eighth part of all the tilled lands, and but about one-third of the untilled lands, most of which would do well in this cereal. The capacity of the State, therefore, for wheat production has not been reached. With an extension of the tile

* Tenth Census. † *American Newspaper Annual.*

drainage, now so successfully introduced, and the use of fertilizers, the wheat crop can be quadrupled without encroaching on the land at present devoted to corn. The corn crop can be largely increased by improved tillage; but, even without adding to the present average annual crop, the product of fat cattle and hogs can be easily and profitably doubled by converting a part of the surplus corn, hitherto shipped abroad, into beef and pork.

The farm and orchard products of Illinois, in 1880, exceeded five times the gold and silver product of all the mines of the entire country. If the rate of increase for the past ten years is maintained, as is likely to be the case, the farm products of 1890 should be worth $400,000,000, or more than one-fifth the present amount of the national debt. Well has a contributor to the Boston *Advertiser* written: "The great area, increased production, and growing prosperity of the Western States in general, only make the progress of Illinois more striking by comparison." And yet the signs of the times proclaim that the greatest triumphs of this State during the decade now dawning upon it, will be achieved, not in the fields, but in the factory and the emporium—in the development of manufactures and the extension of commerce. In my discussion of the migration of industrial centres, I have shown that several of the most important mechanical industries have moved westward until they are now within this State. The Census shows that others are rapidly migrating in this direction, to get near the sources of supply of food, the crude material, the great body of consumers, and the Western centres of exchange, whose commerce, as I have shown elsewhere, has of late even outstripped the agricultural progress of the land. Undoubtedly the railway magnates, whose feats of civil engineering, in the manifold recent transformations wrought in the wilds of the West, have put necromancy to the blush and dumbfounded the political economists with their success, will continue to push forward their overland transportation systems, leading civilization after them, not only until every section of fertile farm and pasture land of the South and the West, and every treasure cove of the Rocky Mountains and the Sierras, has been penetrated; but until the utmost bounds of the Union have been reached at all the great ocean ports, and extensions have been pushed beyond our limits far out into British America, on one side, and into

Mexico, on the other. While I write, the announcement is made that "the union between the Atchison, Topeka & Santa Fe and the Southern Pacific is consummated, and the first train from San Francisco to Chicago via this route leaves the Pacific coast to-morrow."

Nor can the people of Illinois rest until the union of the Mississippi and the Great Lakes is perfected at the wharves of Chicago. Even now a convention is called to adopt means to this end without delay. Considering that the State is now virtually out of debt; that the expenses of the State government are, for the most part, permanently provided for, from this time forward, out of its share of the earnings of the Illinois Central railroad; that public buildings, bridges, roads, and other improvements of over fifty million dollars in value, have been constructed, and the local indebtedness incurred for the last of these has been largely reduced, while a constitutional provision interdicts excessive municipal debt making in future; that, while the products of the field rapidly increased, the products of the factories of Illinois more than doubled, between the beginning of 1870 and the close of 1880; that the ratio of home capital in all kinds of enterprises was enormously augmented, while foreign capital poured in much more rapidly than ever before; that commerce outran all previous records by hundreds of millions; that all who seek employment here find it; and that all the potent forces described above, are ceaselessly at work to extend and multiply the achievements and accumulations of the past—it would be presumption in any one to undertake to say what the history of Illinois for the next ten years will bring forth. It is impossible, however, to suppress expectations of a growth of grand proportions; a growth more remarkable, if possible, than anything in the past, however much like a magician's tale this would sound in any other age than ours, or in any other region than the West.

CHAPTER VII.

STATE OF MICHIGAN.

GRANTING that the original "Mitchie Sanguenaw" signifies "Lake Country," Michigan is peculiarly well named. It has a total lake shore line of 1,620 miles, and has within its borders not less than 5,173 lakes and lakelets, covering an area of 712,864 acres. Michigan is also very happily termed "The Peninsula State." It consists of two natural divisions. The Lower or Southern one is entirely surrounded by water, except on the south, where a line nearly coincident with the parallel of 41° 41′ north latitude separates it from Ohio, and that of 41° 46′ from Indiana. It is separated on the east and northeast from the British Possessions by the line of the mid-channel of the western end of Lake Erie, the Detroit and St. Clair rivers, Lake St. Clair, and Lake Huron. On the west, it is divided from Wisconsin and Illinois by the central line of Lake Michigan. The Upper Peninsula, of about one-half the area of the Lower, projects, in a long, narrow strip, deeply indented with bays and jagged with far-protruding capes, between Lake Superior and the Straits of St. Mary, on the north, and the upper extremities of Lakes Huron and Michigan and the lower end of Green Bay, on the south. It is divided from Wisconsin by a line running from Green Bay up the Menominee, thence up the south branch of the Bois Brule to its head, thence northerly to the Montreal river, down it to Lake Superior, and out to the Canadian boundary line, between Isle Royale and the north shore of this prince of all the lakes. All the coast line of Michigan is gemmed with islets, of which there are 179 within its jurisdiction, of all sizes; from Isle Royale, which forms a county in itself of over fifty miles in length by ten miles in width, to islets of only a few acres. The total area of these outlying morsels of the State aggregates 404,730 acres. No other State in the Union has such an irregular contour or such an extent of coast in proportion to its area; or, as I shall show, such a diversity of climate. It

stretches through nearly seven degrees of latitude, from north latitude 41° 41′ to north latitude 47° 28′.* The Tenth Census estimates its area at 58,915 square miles, or 37,705,600 acres; about two per cent. of the surface of the United States, omitting Alaska. The extreme length of the Upper Peninsula is 318 miles, and its greatest breadth 164.28 miles, although it averages less than sixty. The extreme length of the Lower Peninsula is 277 miles, from the northwest corner of Ohio to McGulpin Point, at the western extremity of Mackinaw Straits; and its greatest breadth, between Forestville and Little Point Au Sable, is 197 miles. Carp Lake—in Lebanon county, 670 miles, measured on a great circle, from New York City—is the center of the State.

The surface of the Lower Peninsula is generally level or very slightly undulating, consisting of plains, plateaux, and rounded hills. Traveling from the east and west coasts inward, we find a region considerably elevated, being in some places 1,000 feet above the lakes. A remarkable depression stretches across the State, from the inner curve of Saginaw Bay up the Saginaw and Bad rivers, and across the low divide—in no place more than seventy-two feet above the lakes—between these streams and the Maple and Grand rivers, which empty into Lake Michigan. The southeastern water-shed runs in an irregular, almost crescent-shaped, wave of fertile ridges and plateaux, across the southeastern quarter of the State, beginning in Huron county, curving towards the southeast and then towards the west, and so extending, through Sanilac, Lapeer, Oakland, Washtenaw, Lenawee, and Hillsdale counties, to the Indiana line; the highest summit-levels ranging from 400 feet in the north to 613 feet in Hillsdale county—the highest elevation south of Saginaw. Here, within a space of about four miles square, no less than five rivers take their rise: the Maumee of Indiana, the St. Joseph, the Kalamazoo, the Grand, and the Raisin. North of the Saginaw, the water-shed consists, for the most part, of rolling lands, with the highest summit-levels nearly midway between the lakes, and varying from 700 feet in height in the southern portion to 1,100 and even 1,200 feet in the north. In all, there are some eighteen summits in Lower Michigan, none of which, however, are marked by any great irregularities of surface. Through these, descending towards the opposite lacustrine basins, the Raisin river flows into Lake Erie; the Sag-

* Gull Islet, the extreme northern point of Michigan, off Isle Royale, is in latitude 48° 19′.

inaw, Au Sable, Thunder Bay, and Cheboygan rivers, into Lake Huron; and the Manistee, Muskegon, Grand, Kalamazoo, and St. Joseph rivers, into Lake Michigan. None of these have cut rugged cañons for themselves; but, aided by climatic forces, they have worn winding paths, with sloping banks, through broad and fertile vales, well suited to agriculture.

The Upper Peninsula is rugged; and both the surface and climate rather repel the farmer. The Porcupine Mountains constitute the water-shed between Lake Superior and Lake Michigan, running westward from the Sault Ste. Marie, at no considerable distance from the coast of the former lake, to the neighborhood of Marquette. Beyond this, a range of less height branches to the northward, far out into the lake, forming Keweenaw promontory, and another range, or succession of broken ridges, extends farther west, to the Wisconsin line. On either side of these ranges the mountains are succeeded by sandy plains, rounded hills, and gently undulating ridges, descending at last in easy gradients towards the lakes, or off into the plain country of Wisconsin. The principal rivers of this part of the State are the Ontonagon and the Tequamenon. Neither in the Upper nor Lower Peninsula are the rivers of Michigan navigable for more than a few miles above their mouths, which, with the help of the general government, have been converted into good harbors; Detroit, Port Huron, Saginaw, Alpena, Muskegon, Grand Haven, St. Joseph, Escanaba, Marquette, and Eagle Harbors being the principal ones. There are, in all, 125 rivers and more than fifty considerable creeks on the chart before me, besides the 5,178 lakes I have spoken of, constituting an irrigation and drainage system that is, to say the least, remarkable. The use of these rivers for driving water-wheels and floating logs is of immense value. For example, while the Saginaw river is navigable only eighteen miles from the bay, within this space are located the principal lumbering and salt manufacturing establishments of that part of the State, and into this focus of the east shore lumbering industry, converge the Cass river, 125 miles long; Flint river, 103 miles; Shiawassee, 95 miles; Bad river, 54 miles; Tittibawassee, 117 miles; Chippewa, 90 miles; Pine river, 120 miles; Salt river, 50 miles; Cedar river, 48 miles; or in all, 864 miles for floating and drainage purposes; draining an area of 3,500,000 acres, and bringing to mill over 600,000,000 feet of logs in a single season.

Geologically considered, the Lower Peninsula occupies the central part of an immense synclinal basin, extending eastward and northward several hundred miles into the Dominion of Canada, and westward and southward into the central portions of Wisconsin and Indiana. The whole series of strata is likened by Professor Winchell to a nest of wooden bowls. Uppermost in this series, are the Coal Measures, covering Clare, Gladwin, Bay, Isabella, Midland, Montcalm, Gratiot, Saginaw, Shiawassee, Clinton, Ionia, Ingham, and considerable portions of Genesee, Livingstone, and Eaton counties, all in the central portion of Lower Michigan. Traveling outward from the Coal Measures in any direction, one crosses the outcrops of the older strata, which form on the geological chart of the State a series of concentric rings, in the following order: Parma sandstone, Carboniferous limestone, Michigan salt group, Marshall group, Huron, Little Traverse, and Corniferous groups; and, on the extreme northern point, facing Mackinac, and in the extreme southeastern corner, a narrow outcrop of the Lower Helderberg. Passing northwesterly across the upper end of Lake Michigan, into the Upper Peninsula, one steps first upon the Salina and Niagara groups, then over narrow belts of the Cincinnati, Trenton, and Chazy formations, and then upon the Lake Superior sandstone, which skirts Lake Superior for many miles south, and westward, into Marquette county. Beyond this he finds broad exposures of the Laurentian formation, consisting of metamorphic slates and gneiss rocks, in which the magnetic and specular iron ores are discovered, the Huron shales, and a second belt of Superior sandstone, through both of which the Azoic rocks push their way to the surface in immense masses of trap, in which are found imbedded the rich argentine ores of copper for which this region is famous.

The soil of Southern Michigan is, for the most part, a light, sandy loam. In the broad valleys of the four streams that flow through the central depression of the Lower Peninsula, there is a deep, rich alluvium, as is the case also in the valleys of the Kalamazoo and St. Joseph, and along the shores of the Detroit and the St. Clair. As a rule, the soils in the southern portion of the State are deep and rich, producing excellent crops of corn and other cereals. The elevated timber lands in the north are not, usually, covered with strong soils, and along the western

tiers of counties, for a short distance back from the lake, there is too much sand for abundant crops.

The climate of Southern Michigan, tempered by its insular position, is considerably milder than those parts of Wisconsin and Illinois between the same parallels, the temperature throughout the year marking two to eight degrees higher on the scale. The mean annual temperature of the Lower Peninsula is about 47.25°, and that of the Upper Peninsula, 40.4°. There is considerable variation in the mean temperature between places on the shores of the lakes and in the interior of the Lower Peninsula, on the same parallels. For example, the mean temperature at Detroit is 45.5°, while at Lansing, 35′ farther north, it is only 49.1°. In the Upper Peninsula, the mean temperature at Marquette, in latitude 46° 33′, is 38.3°, while at Ontonagon, in latitude 46° 53′, and but sixty feet lower, it is 44.33° The mean rainfall varies from 20.99 inches at Traverse City, 583 feet elevation, to the exceptional measure of 45.57 inches at Litchfield, 1,007 feet elevation. At Copper Falls, Upper Michigan, it is 37.23 in.; at Ontonagon, 24.3; at Marquette, 31.02; at Mackinaw, only 24.28. At Grand Haven, it is 25.32 in.; at Grand Rapids, but a few miles inland from Grand Haven, it is 39.81; at Lansing, it is 30.31; at Detroit, 35.09; at Monroe, 31.8. The mean annual precipitation over the Upper Peninsula is thirty inches, and over the Lower Peninsula, 32 inches. The distribution of the rainfall through the seasons is, for the Upper Peninsula, nineteen inches in the spring, twenty-seven inches in the summer, 28.8 in the autumn, and twenty-two in the winter; while in Lower Michigan it is 25.8 inches in the spring, 28.7 in the summer, 27.3 in the autumn, and 19.1 in the winter. Although the climate is one of extremes, it is remarkably wholesome, as is attested by the vital statistics. The northwest shore, from Grand Haven to Mackinaw, is recommended by the medical profession to invalids seeking a pure and invigorating atmosphere, and is now a favorite summer resort for such persons and for sportsmen and tourists.

As I have had occasion to remark in regard to other Western States, the health of Michigan improves, from decade to decade, as the settlement of the country progresses and the comforts of life increase. The swamps and marshes referred to in the report of the Surveyor-general of Ohio in 1815, from which I shall quote hereafter, were never so numerous nor extensive as he

represented; but they were mischievous enough to breed malarial diseases among the early settlers, which carried off a much larger percentage of the inhabitants then than now. Drainage and tillage have told very favorably on the vital statistics, as well as upon the wealth of the State. As I shall show when speaking of farm products, the climate of the Upper Peninsula is too severe for corn, which is apt to be frost-killed, but spring wheat and hardy cereals mature well. In 1878, the average wheat yield in Keweenaw, the northernmost county of the State, was twenty-three and one-half bushels; that of Baraga county, the next south, twenty-four bushels; that of Marquette, still further south, fourteen and three-quarters bushels; which was fully equal to the average yield of the best wheat-growing part of the Lower Peninsula the same year, and shows, that, whatever discouragements to wheat raising exist in that part of the State, the climate is not in fault.

The forests of Michigan are among its most valuable natural products. The southern part of the State is not heavily wooded, there being a considerable proportion of prairie, and many oak openings. Along the river valleys, however, there are broad belts of hard timber. As we pass north, the forests grow in density. Immense quantities of lumber have been made in the State, and the northern part of the Lower Peninsula and the greater part of the Upper Peninsula are still covered with little else than woods. This is so, notwithstanding great inroads have been made on the pine districts within convenient distances of all the rivers of Lower Michigan, so that now many of the logs brought to the great milling centres must be carried to the streams or directly to the mills by private trams or railways.

The clearings of the forests have progressed so rapidly of late years as to cause considerable alarm, it being claimed that the winter-killing of wheat and orchard trees, so much more frequent of late years than formerly, is due to climatic differences caused by the destruction of the forests. Laws for the encouragement of timber planting and timber preservation have been passed, but thus far with no result worthy of mention. The pine region has no distinct boundaries, the pine being more or less interspersed with spruce, beech, hemlock, birch, tamarack, oak, elm, linden, walnut, hickory, ash, maple, and aspen. The southern edge of the State never had any considerable amount of pine, but, in addition to the hardwood trees already named, it produces dog-

wood, sycamore, cherry, cypress, chestnut, and several other species. The catalogue of the products of Michigan in the Centennial Exposition contains a record of eighty-five logs that scaled 107,455 feet, an average of 1,264 feet. The largest of the lot scaled the astonishing sum of 2,025 feet; several scaled over 1,700 feet; and another lot, of 200 logs, averaged 900 feet each. A black walnut log was catalogued that brought $1,000, and another that brought $1,200, and a "blister" walnut log, for which the owner declined $2,000.

It is difficult to comprehend the enormous aggregate of lumber produced in Michigan. The total number of logs run out of the Saginaw district alone in the eleven years ending with 1877, amounted to 5,860,992,551 feet. According to a computation given in Mr. Hough's Report upon Forestry for 1877, this quantity, cut into one-inch boards, would gird the earth, at the equator, with a floor nearly forty-four feet wide, or would lay a floor four and six-tenths feet wide over a distance as far as from the earth to the moon. Yet, this is but a small fraction of the lumber yield of Michigan during the past twenty-five years. In 1876 alone, the lumber manufactured in the Lower Peninsula amounted to 713,851,000 feet on the eastern shore; to 762,432,123 on the western shore; to 505,335,000 on railroad lines; a total of 1,981,618,123 feet; and, in the Upper Peninsula, to 184,635,870 feet; making the enormous aggregate of 2,166,253,993 feet. This was over fifty-nine per cent. of the entire product for that year of all the mills of Michigan and Wisconsin added to those of Minnesota, Iowa, Illinois, and Missouri, on the Mississippi as far south as St. Louis. Yet the product for the succeeding years has been still more enormous.

Lumber was first manufactured in the Saginaw Valley, long recognized as the leading source of supply in this State, in 1832. Three years later another mill was built, which was constructed with a capacity of 3,000,000 feet per annum. In 1836, the first shipments of lumber were made from this mill. In 1854, there were twenty-three mills on the Saginaw river, with an aggregate capacity of 60,000,000 feet; their average cut being about 3,000,000 feet per annum. Ten years later, there were eighty-two mills in operation, manufacturing 423,963,190 feet of lumber. In 1870, there were eighty-three mills, producing, that year, 576,726,606 feet. Since 1870, there has been an almost steady decrease in the number of mills in operation in this valley.

The number finishing their cut-out is constantly increasing, and those destroyed by fire are not rebuilt. The new mills annually erected do not equal in number those "cut out" and destroyed each year. Hence the decrease from eighty-three mills in operation in the Saginaw valley in 1870 to the sixty-seven running in 1880. But, though the number of mills has decreased, it will be seen, on reference to figures given below, that the production has increased, in the time mentioned, from 576,726,606 feet to 863,356,009 feet. The total day capacity of the Saginaw valley mills is now 923,000,000 feet per annum. The extent of the operations in the valley during the past sixteen years is shown in the following table:

PRODUCTION AND SALES.

Years.	Production.	On Dock	Sales.	Unsold.
1865	250,689,840	44,453,000	22,363,000	19,091,000
1866	349,767,884	44,415,700	14,211,000	30,204,700
1867	423,963,190	69,969,771	19,435,571	50,534,200
1868	457,396,235	67,401,017	13,402,990	53,998,027
1869	523,500,180	93,331,614	14,526,000	78,805,514
1870	576,726,606	130,422,190	47,862,000	82,560,100
1871	529,682,878	75,599,511	33,576,000	42,023,511
1872	602,118,980	152,822,553	40,928,200	111,894,353
1873	619,867,021	222,071,665	30,893,000	191,178,965
1874	573,622 771	213,153,663	23,135,000	190,017,663
1875	581,558,278	228,202,108	26,595,578	196,606,530
1876	573,950,771	234,546,657	30,000,000	194,546,657
1877	640,166,231	245,985,522	23,511,666	222,323,856
1878	574,162,757	247,572,388	18,640,280	228,932,108
1879	717,461,455	221,864,595	85,647,837	136,216,758
1880	863 356,009	295,870,633	92,108,596	203,667,037

From the above table, it will be seen that the total production of the Saginaw valley mills of lumber alone, during the past sixteen years, reaches the enormous total of 8,857,951,171 feet, an average of over 500,000,000 feet yearly. In 1872, it was thought that the mills of the valley had reached the limit of their production, but it is shown above that the output for that year has since been exceeded four times. The production of 1880, compared with that of 1872, shows an increase of 261,237,029 feet, a gain of nearly forty-five per cent. It will also be observed, that the stocks carried over at the close of the past season were the largest ever known.

The mills were well supplied with logs last year, and improved their opportunities. The proportion of the stock sold to that unsold at the close of last season, was not as great as the year previous, but was far greater than that noted for 1878, and, in

comparison with the records of previous years, makes a favorable exhibit.

The bulk of Saginaw lumber is transported by water to Ohio and New York ports, and thence into the principal markets of the East. A considerable portion is shipped by vessels to Chicago and Milwaukee, and thence distributed by rail throughout the West. The wide market opened to this lumber is due to quality. Twenty years ago, timber that would run twenty-five per cent. uppers was considered common; forty per cent. was the rule, and as high as seventy-five per cent. "uppers" were sometimes obtained. Lumbermen were also more particular. Logs were then only cut from the trunk of the tree and below the top, and only the most stalwart trees selected. Now, land that has been cut over three times is again gone over, and the lumbermen are satisfied if the logs run ten per cent. uppers, and extremely gratified if the average is fifteen per cent. uppers.

Prices for pine lands have appreciated during the past year $10 to $50 per acre, according to location and the quality of timber. Good pieces of timber range in value from $50 to $100 per acre.

There are 520 mills in Michigan lumbering districts. These embrace all, or very nearly all, of the important ones, and all that have entered into the calculations of statisticians in estimating the State's production in previous years. There are many mills remote from railroads and shipping points that manufacture chiefly, if not altogether, for home consumption. The exact amount of lumber manufactured in each of the leading districts of Michigan during the past four years is given in the following table:

LUMBER MANUFACTURED.

Locality.	1880.	1879.	1878.	1877.
Saginaw valley	603,258,000	717,761,451	574,169,787	610,714,910
Lake Huron shore	289,127,000	313,864,000	226,400,000	196,650,000
Green Bay shore	505,758,000	468,325,000	382,236,594	211,870,000
Cheboygan	78,900,000	86,000,000	55,500,000	52,500,000
Manistee	207,050,321	197,382,000	160,212,000	148,268,153
Ludington	118,277,997	111,960,000	120,985,000	107,285,873
White Lake	91,451,498	88,150,000	89,617,107	82,460,000
Muskegon	505,458,505	504,555,000	356,991,000	257,245,198
Grand Haven and Spring Lake	132,919,659	133,795,000	90,000,000	80,205,871
Flint & Pere Marquette Railroad	213,771,000	80,650,000	59,841,328	75,710,000
Miscellaneous: Interior, Northern, and Eastern Michigan points	780,398,994	694,581,228	616,958,000	554,386,000
Miscellaneous: Western Michigan points	82,450,000	74,195,000	57,500,000	60,000,000
Totals	3,585,187,227	3,426,373,713	2,823,945,000	2,577,160,569

A comparison of the figures given above, shows that there were 651,510,514 feet more lumber manufactured in Michigan in 1880 than in 1879, when the production was 658,433,674 feet greater than the year previous. The extent of the increase in each of the past two years is remarkable for its uniformity; that of 1879, in round numbers, being 658,000,000 feet; and that of 1880, 651,000,000 feet. Omitting the production of the Wisconsin mills—169,020,898 feet—included in the table, the exact production of lumber in Michigan alone, in 1880, amounts to the grand total of 3,769,166,329 feet. The aggregate amount of lumber on hand at the mills in the districts of Michigan, at the close of each of the last four seasons, is shown in the accompanying table:

LUMBER ON HAND.

Locality.	1880.	1879.	1878.	1877.
Saginaw valley	293,370,632	221,264,595	247,972,262	245,935,522
Lake Huron shore	82,662,949	67,397,581	73,128,231	70,927,874
Green Bay shore	78,907,589	54,533,000	44,398,906	23,955,000
Cheboygan	28,700,000	6,375,000	11,250,000	7,650,000
Manistee	14,975,000	12,170,000	22,286,471	15,078,961
Ludington	10,400,000	8,485,000	10,250,000	4,600,000
White Lake	11,471,86	10,650,000	11,191,000	5,700,000
Muskegon	79,750,429	56,653,000	69,732,800	27,751,000
Grand Haven and Spring Lake	47,552,100	33,644,000	40,000,000	32,212,167
Flint & Pere Marquette Railroad	32,775,000	30,842,742	34,127,800	28,826,427
Miscellaneous: Interior, Northern, and Eastern Michigan points	184,780,834	160,587,000	178,426,500	171,684,944
Miscellaneous: Western Michigan points	12,062,000	14,105,000	15,806,512	16,000,000
Totals	896,617,679	677,326,918	756,923,682	650,119,207

The estimated number of shingles manufactured in Michigan during each of the past four years, is shown in the following table:

SHINGLES MANUFACTURED.

Locality.	1880.	1879.	1878.	1877.
Saginaw valley	241,075,160	203,084,750	153,989,750	135,971,800
Lake Huron shore	63,361,970	75,800,000	61,400,000	53,900,000
Flint & Pere Marquette Railroad	196,797,500	90,275,000	128,450,000	166,080,000
Manistee	440,434,600	366,684,000	340,116,000	205,000,000
White Hall and Montague*	70,000,000	65,400,000	44,800,000	34,700,000
Miscellaneous points*	1,400,000,000	1,257,891,000	1,032,450,000	1,324,049,000
Totals	2,429,659,230	2,058,084,750	1,766,205,750	1,917,670,500

Each of the districts mentioned shows an increase from the year previous, aggregating 370,574,480. The mills along the line of the Flint & Pere Marquette Railroad report the largest

* Figures for 1880 partly estimated.

increase, viz., 103,000,000; while Manistee follows with a gain of 73,000,000, and the Saginaw valley with an improvement of 39,000,000. The average price in the Saginaw valley was $1 90 to $2. Logging was carried on most successfully during 1880. In the Saginaw valley and at Muskegon and Manistee, the three leading rafting points in Michigan, the operations were the largest ever known. In addition to the logs rafted, there were extensive operations in railroad logging. The introduction of railroad logging has wrought a great change within the past five years. Now the supply is regulated almost entirely by the anticipated demand, a condition of affairs more satisfactory to all concerned. The extent of the logging operations in the Saginaw valley and at Muskegon, Manistee, and by the Flint & Pere Marquette railroad, in past years, is shown in the following table:

LOGGING.

Years.	Saginaw Valley.	Muskegon.	Manistee.	Flint & Pere Marquette R. R.
1865	200,000,000	108,505,700	.....	.....
1866	209,000 000	157,468,300	.....	.....
1867	429,207,808	288,502,200	.....	.....
1868	446,960,583	313,692,600	.....	.....
1869	321.350,663	267,789,900	.....	.....
1870	623,397,353	198,862,600	121,221,395	.....
1871	521,796,927	350,000,000	142,369,817	.....
1872	645,285,278	315,000,000	155.556,739	.....
1873	680,979,461	376,085,067	179,880,243	.....
1874	589,225,404	294 571,527	182,318,888	.....
1875	584,843,701	309,638,418	168,926,197	.....
1876	572,229,472	299,525,919	147,794,241	.....
1877	651,567,948	312,285,951	152,221,548	.....
1878	558,079,674	340,990,055	178,542,869	.....
1879	780,182 286	432,431,679	211,722,090	14,357,670
1880	948,174,274	580,000,000	211,971,000	87,485,547
Totals	8,763,280,833	4,771,345,700	1,871,993,443	101,843,217

Such statistics as the above have led to a good deal of discussion as to the probable continuance of the forests of the Northwest to supply the demands of the country. Statisticians have been unable to discover any way by which the exact acreage of the forest standing can be determined. Twenty years ago it was predicted that the forests then standing would not last fifteen years; notwithstanding, there are millions and millions feet more now in sight than then. Railroads have, within the past few years, penetrated forests hitherto unknown.

In 1868 it was estimated that there were 4,000,000 acres of timber standing in the State; that, at the rate of exhaustion, 400,000,000 feet annually, would furnish a supply for but twelve to fourteen years: eighteen years was named as the utmost limit. Twelve years have passed since that prediction was made; and, although since then the cut has exceeded 1,000,000,000 feet yearly, and during the past three years more than double those figures, yet lumbermen anticipate a yearly cut equal to that of 1880 for ten or twelve years to come. Two years ago a lumberman who had considerable reputation as to his knowledge of the extent of the timber supply, made the following compilation as to the quantity then standing in Michigan:

STANDING TIMBER SUPPLY.

Eastern Shore, Sebewaing to Algonac, including Flint, Lapeer, and Cass river	1,500,000,000
Rifle river	3,500,000,000
Au Sable	8,000,000,000
Thunder Bay and shore	3,000,000,000
Cheboygan	1,000,000,000
Manistee	6,000,000,000
Manistee to White river, including Pere Marquette river	4,000,000,000
Muskegon	3,000,000,000
Grand river	1,000,000,000
Saginaw and tributaries, excepting Flint and Cass rivers	6,000,000,000
Upper Peninsula, including Monastique, Escanaba, Sturgeon, White Fish, and intermediate points	10,000,000,000
Smaller districts not included in the above	2,000,000,000
Total	44,000,000,000

The forests of Michigan, if of the magnitude above indicated, would last, at the present rate of destruction, about eleven years. Their loss, it is thought, will not work irreparable injury to the commercial interests of the State, however, as the ground once covered with pine timber has been found to be remarkably well adapted for agricultural pursuits. The owners of the territory at present covered with timber can, therefore, rest assured of a satisfactory future for their possessions, while others interested may confide in a continued prosperity for Michigan when the transmutation of the forests to fields has been accomplished. The shipments of hardwood timber are constantly increasing in importance. Shipments of this kind to Quebec, Montreal, Cleveland, Buffalo, and Chicago, rose from 765,000 cubic feet in 1869, to 2,540,000 feet in 1872, besides, for the latter year,

12,690,100 staves. Since then, this business has steadily increased.

Among other products of the forests must be mentioned, 4,299,793 pounds of maple sugar (in 1879), immense quantities of hemlock bark, potash, and pearlash, and hundreds of thousands of cedar posts, and cords of wood, not only for home use but for export to Chicago and the Lower Lakes.

The quarries of Michigan yield an abundance of excellent building materials. The best qualities of granite, syenite, diorite, and gneiss, are found in the Upper Peninsula; good roofing slates, in the vicinity of L'Anse, of which over 2,000 squares were shipped in 1878; brown freestone, similar to the brown sandstone of Portland, Conn., so popular in New York City, is easily quarried at Marquette, L'Anse, and other points, and exported in considerable quantities to nearly all the lake cities. Nearly 500,000 cubic feet of this stone was shipped during 1869 to 1878, inclusive. A reddish mottled freestone exists at Ionia. A bluish gray freestone, quite like the Cleveland freestone, is quarried at Point aux Barques; buff freestone in Jackson county; a dull white freestone at Parma; and limestone of several varieties and good quality at many places, especially on Drummond's Island, off the extreme eastern point of the Upper Peninsula, where it is easily obtained, in Little Traverse Bay, and at London, in the opposite corner of the State, where the same formation crops out. Marbles of many varieties abound, from a fair quality of statuary marble, in the Menominee region, to nearly all colors and qualities of the coarser kinds. A handsome mottled variety, making elegant mantels, and table and bureau tops, is obtained at Marquette; and coralline marble, from the Little Traverse group. The Lake Superior quartzite has displaced the English article for lining Bessemer steel converters. Over 5,500 tons of it were shipped in 1878. Alabaster and the coarser kinds of gypsum are taken from the Salt group in Lower Michigan. The principal quarries and manufactories of gypsum are in Kent county, at and about Grand Rapids, where the production of plaster of Paris for agricultural and building purposes is a profitable industry. The land plaster manufactured in 1878 amounted to 75,000 tons, and the calcining plaster to 50,000 barrels. Grindstones are made from a very fair grit quarried near Thunder Bay. Two establishments produced stone valued at $78,400, in 1870. An

inferior sort of lithographic stone exists in various places.

Salt, in the form of strong brine, is easily obtained by sinking artesian wells into the Salt group, underlying the Coal Measures, and outcropping in a considerable belt around these measures. The principal salt-manufacturing districts are in the Saginaw, the Grand, and the Tittibawassee river valleys, where the geological formation favors the sinking of wells. These average about 800 feet, and have a capacity of from ten to twenty gallons per minute. In Saginaw county, as in most salt-producing parts of Michigan, the salt wells are sunk near lumber mills, and the exhaust steam from the latter is used to evaporate the brine. The only fuel used is slabs and sawdust. In this way the manufacture is carried on with great economy. At the close of 1877 this business was all in the control of seventy-nine manufactories, of which thirteen were located on the shore of Saginaw Bay, from Port Austin to Oscoda, twenty-seven were in Bay county, and thirty-nine in Saginaw county. Their capacity was 2,100,000 barrels, and the amount manufactured, according to the report of the State inspectors, was 1,660,897 barrels; of which 1,590,841 barrels were fine salt; 20,858, packer's salt; 22,949, solar salt; and 26,249, second quality. The quantity made by steam was 1,083,646 barrels, and by solar evaporation, 22,946. The collateral products of these brines are beginning to have a considerable value, in the production of artificial stone, calcined magnesia, and bromide of magnesia. The refuse salt is a valuable manure. Salt manufacture began in Michigan in 1859. The product in 1860 was 2,360 bushels, and the annual yield has steadily increased until, in 1880, it reached by computation in the Tenth Census, the immense amount of 12,425,885 bushels, or 42 per cent. more than the salt product of New York.

The coal mines of this State are not very productive. The coal beds are for the most part too low to be worked without pumping. Wood is still so abundant that there is little local inducement for mining, as the total product reported in the Census of 1870 was 150 tons in Ingham county, and 28,000 tons in Jackson, the next county south. In 1879 the State commissioner of mining statistics reported a product of 77,715 tons for the year 1878.

The whole region underlaid by the Coal Measures is computed by Professor Winchell at 6,700 square miles. Their whole thickness at East Saginaw, which is over their lowest depression, is

128 feet. It appears from the State report, that one persistent seam of coal runs through the whole Coal Measure formation, ranging in thickness from three to five feet, the greatest thickness yet discovered, which is at Six Mile Creek. Under this seam, at the place named, are three other seams of two feet each, separated only by layers of clay, eighteen inches, thirty inches, and forty-two inches, respectively. The quality of the Michigan coal is inferior; that of Jackson county containing forty-five per cent of carbon, forty-nine of volatile matter, two of ash, two of water, and two of sulphur.

The mining wealth of Michigan lies principally in the Upper Peninsula, where nature has bestowed little else than the iron, copper, and silver ores, immense forests, and valuable quarries and fisheries. The principal copper mines are in Houghton, Keweenaw, and Ontonagon counties, the first of these being, thus far, the chief producer. In these counties, in 1870, there were twenty-seven mines, employing eighty-six steam engines, of 5,943 horse power; 1,421 men above ground, and 2,755 under ground; the capital invested was $5,586,374; the wages paid amounted to $2,346,535; the materials used, to $555,416; and the product, to $4,312,257. In 1879, Mr. Charles E. Wright, State Commissioner of Mineral Statistics, reported seventy copper-mining companies, which, with sundry minor companies unnamed, produced, in 1878, a total of 20,266 tons 492 pounds of copper ore, valued at $6,628,000. He gives the total product of the Michigan mines down to 1878, inclusive, at 253,085 tons, valued at $123,394,000. The iron product in 1870 was all in Marquette county, where eleven mining establishments, with twenty-four steam engines of 1,137 horse power, 430 men above ground, 1,575 men under ground, $3,810,000 capital engaged, paid $1,270,698 in wages, used $353,493 worth of materials, and produced 690,393 tons of iron, worth $2,677,965. In 1872, Michigan ranked next to Pennsylvania in the output of iron ore, yielding about one-fifth of the entire product of the United States, and one-thirteenth of the entire iron yield of the world. Within the last few years, the mines of the Menominee range have risen into great prominence. The quality of the iron shipped from Escanaba is practically perfect, being free from phosphorus and sulphur, and so rich that ores of less than fifty-five per cent. pure metal are left at the mines. The shipments of ore from Escanaba have suddenly risen from 10,000 tons, a few years ago, to

600,000 tons in 1880. In 1878, according to the report of the State Commissioner of Mineral Statistics, the total product of the Michigan iron mines was 1,125,231 tons. This was 100,102 tons in excess of the amount for 1877, and within 79,003 tons of the yield of 1873, when the Lake Superior mines yielded 1,195,234 tons, the largest yield on record. The total amount of iron shipped from this region, down to the end of 1878, was 11,789,922 tons.

In 1880, according to Bradstreet's, the refined copper from the Lake Superior mines aggregated 24,869 tons and 367 pounds, valued at $9,947,673; and the product of the iron mines and furnaces, both ore and pig metal, amounted to 2,036,121 tons, valued at $19,457,427.

Silver is found in the Lake Superior copper region. The product of 1879 is given at $780,000.

The Lake Fisheries of this State are of great and rapidly increasing importance. Professor G. Brown Goode, of the Census Bureau, reports that in 1879, they employed 1,781 fishermen, and apparatus, vessels, boats, steam tugs, seines, wharves, and store houses valued at $885,330. They produced 12,902,250 pounds of whitefish and 11,110,600 pounds of other fish, valued at $711,695, or nearly fifty per cent. more than the Ohio lake fisheries, the next in importance. The product of 1880 is estimated at 1,000,000.*

Michigan is the thirteenth State added to the original thirteen members of the Union, and is the fourth one formed from that Northwest Territory whose history has already been given, in general terms, down to the time when that part of it between Lake Huron and Lake Michigan was organized into a Territory, in 1805.† When Illinois became a State, in 1818, all of what now constitutes Wisconsin, Minnesota east of the Mississippi, and the Upper Peninsula of Michigan, were added to this Territory, and continued under the same government until Michigan, with its present limits, became a State. From 1805 to 1823, it was governed very much as the whole Northwest Territory was up to the time of the organization of the Territory of Ohio—by a governor and judges appointed by the President,

* Inaugural address of Governor Jerome.

† Michigan fairly claims to be the oldest, in point of European settlement, of all the Western States. French missionaries, closely followed, if not preceded, by the fur traders of the St. Lawrence, ascended the Ottawa river, crossed the wilds of Upper Canada to the Huron shore, and thence into Michigan; and, between 1641 and 1671, planted mission stations at St. Mary's, near the Falls of St. Mary, at St. Ignace, and at Mackinac. M. Antoine de la Motte Cadillac, with a company of French farmers and mechanics, founded Detroit in 1701.

with the approval of Congress, and clothed with all executive, legislative, and judicial functions. In the latter year, the legislative power was vested in a council of nine members, appointed by the President from eighteen citizens nominated by the people, and the judicial term, which had previously been for life, or during good behavior, was limited to four years. Two years later, the number of councilors was changed to thirteen; and in 1827, Congress, yielding to the popular demand, conferred the power to elect the council upon the people, without the intervention of the President. Several attempts were made before Michigan formed a constitution satisfactory to Congress, and obtained admission to the Union as a State. In 1835, a convention convened at Detroit, adopted a constitution so framed as to make the southern boundary of the new State conform to its construction of the Ordinance of 1787 (generally regarded as a fundamental compact as sacred as the Federal Constitution), which reserved to Congress the power to form two States out of that portion of the Northwest Territory lying "north of a line drawn from the southern bend of Lake Erie to the southern bend of Lake Michigan." The citizens of Michigan maintained that the line indicated in the above-named ordinance was Ohio's constitutional limit, and that the subsequent act of Congress admitting that State with a more northern extension, was void just so far as it went beyond the earlier definition. Toledo, and all the settlers within the disputed section, had never acknowledged any civil jurisdiction but that of Michigan. As soon as Ohio, on the eve of the admission of Michigan into the Union, resolved to assert its jurisdiction, the Governor of Michigan called out the militia to guard Toledo against invasion. Ohio, also, summoned her militia. The troops scowled fiercely at each other; but, fortunately, the commanders hesitated to shed blood, until the general government intervened in time to avert disaster; else, what is now treated by the historian as a farce, would, probably, have ended in a tragedy. Michigan received that portion now known as the "Upper Peninsula" in lieu of the disputed territory, "the dogs of war" were called off, and she took her place as a State in the Union, Jan. 26, 1837.* Since the year 1800, her

* The territory involved in this dispute was but a narrow strip, embracing little more than 600 square miles; but it included Toledo and gave the best harbor on Lake Erie—Maumee Bay—to Ohio. The citizens of that State maintained, that, when Congress reserved to itself, in the Ordinance of 1787, the power to erect two States out of the territory defined, it did not obligate itself to establish

growth in population has been as shown in the following table. It will be seen, that, though Michigan was the first of the Western States to be visited, and in some degree occupied, by Europeans, the population in 1800 was but 551, and that not until subsequent to 1820 did immigration set in with any considerable degree of rapidity. In 1830, the Territory contained 31,639 inhabitants, a gain of 255 per cent. in ten years; in the next decade, immediately preceding and following her transition to Statehood, the gain was 570 per cent. Since then, the growth has continued at a rapid rate, until now she ranks ninth in point of population, in the sisterhood of States.

The accompanying table shows the population of Michigan at nine decennial periods, and the percentage of increase from period to period:

Periods.	Population.	White.	Colored.	Per cent. Increase.
1800	551	551	.....	.....
1810	4,762	4,618	144	76
1820	8,894	8,591	174	87
1830	31,639	31,346	293	255
1840	212,267	211,560	707	570
1850	397,654	395,071	2,583	87
1860	749,113	736,143	6,799	88
1870	1,184,059	1,167,282	11,849*	58
1880	1,636,385‡	1,614,087	22,248†	.....

While, as I have shown, a large portion of Michigan is still covered by primeval forests, and a part of it, embracing the main area of the Upper Peninsula, is too rugged and too severe in climate to be inviting to farmers, the southern half of the Lower Peninsula ranks high in the production of cereals and live stock, and leads the Union in the proportion of its cultivated lands given to orchards, rivaling if not surpassing, in this regard, even Maryland, Delaware, and New Jersey—the famous fruit-growing States of the Atlantic seaboard. The total number of

such States at all, but simply retained the right to act its own pleasure in the premises. That pleasure had been expressed when Ohio entered the Union with the boundary line defined in her constitution, submitted to Congress a third of a century before the pending conflict. When Indiana and Illinois were admitted, in 1816 and 1818, Congress had exercised its prerogative in similar manner, going north of a line drawn from the southern bend of Lake Erie to the southern bend of Lake Michigan to fix the northern limits of both of these States. Had this not been so, nearly two whole tiers of counties, now in Illinois, including Chicago, would have belonged to Wisconsin.

* Including 4,926 Indians.

† Including 7,301 Indians and 27 Chinese.

‡ Of whom, 388,346 were foreign born. The total males numbered 861,978; and the total females, 774,057; the preponderance of males being found mainly in the mining and lumbering regions.

acres in farms in 1879 was 10,315,588, of which 5,785,102 were improved, and 4,530,486 were unimproved; showing that more than two-thirds of the total area of Michigan is still unimproved, while only about one-sixth of it is plowed land. Owing to the large yield per acre, and the price of Michigan farm and orchard products, the farming area of this State is rapidly increasing as the forests disappear. The acres of improved land, reported to the Secretary of State in 1848, were but 1,437,459, or only one-fourth of the present quantity. The increase since 1874 has been 244,263 acres, of which 44,029 acres are in the southern four tiers of counties. The increase in the counties north of these four tiers during the same period was thirty-one per cent. of the improved land in them in 1874, indicating a rapid development of farming industry in that direction. The number of farms in the State in 1879 was 111,816, averaging 92.68 acres each, against an average of 90.05 acres in 1874. This increase in the average size of farms is explained by the fact, that market gardens, which were included among farms in 1874, were excluded from that category in 1879. This may account for the apparent decrease of 1,597 in the number of farms. The following table, compiled from the best official data, shows the number of acres given to each of the farm staples, averaged for the five years from 1875 to 1879 inclusive, the total yield of each, the total estimated value, the yield per acre, and the price of the yield per acre:

Crops.	Total yield of crops of 1879 in bush's, pounds or tons.	Average annual yield in bushels, pounds, or tons for 5 yrs., ending 1879.	Avg. price per bushel, pound or ton for 5 years.	Average annual value of crops for 5 years ending with 1879.	Av'ge ann'l yield p'r acre for 5 yrs. ending 1879.	Avg. ann'l value per acre for 5 yrs. ending 1879.
Indian corn	14,100,000	25,570,240	$ .47	$11,875,140	33.4 bu.	$15.63
Wheat	16,800,000	23,118,464	1.11	24,214,774	16.1 "	17.76
Rye	630,000	262,200	.65+	172,281	14.7 "	9.55
Oats	8,700,000	13,157,220	.36	4,684,638	33.5 "	12.04
Barley	650,000	1,034,560	.72+	747,218	23.5 "	16.87
Buckwheat	850,000	642,240	.61	392,871	16.2 "	10.07
Potatoes	7 500,000	8,197,180	.45	3,462,668	90+ "	38.00
Tobacco	3,500,000					
Hay	1,550 000	1,143,844	10.83	12,276,829	1.26 T	13.63

The foregoing figures, compared with those in the similar tables for the other Western States, demonstrate the fertility of Michigan in the most emphatic manner. They prove, that in her yield per acre of corn (33.4 bushels) she led all of the ten Western States of the Mississippi and Lake regions, except Ohio (34.5), Iowa (34.5), Kansas (37.5), and Nebraska (38); while in

the price realized she stands first, averaging forty-seven per cent. —more than double the price realized in Nebraska. As regards wheat, both in the yield and in the price realized, she led all the other Western States. It must be borne in mind that the figures above, are the averages for five years. It will be universally admitted that the agricultural exhibit here made, is a very fair one for a section of country, of which the Surveyor General of Ohio reported to the General Commissioner of the Land Office on Nov. 30, 1815: "Taking the country all together [referring to Southern Michigan], so far as has been explored, and to all appearances, with the information received concerning the balance, it is so bad there would not be more than one acre out of one hundred, if there would be one out of one thousand, that would in any case admit of cultivation." This report so impressed Congress with the belief that "there were no lands here fit for cultivation," that these sapient geographers and legislators repealed so much of the Act of May, 1812, as provided that one-third of the land grant to soldiers of the second war with Great Britain should be located in Michigan, under the belief that it would be an imposition on those confiding patriots to give them lands in such a dismal region.

The principal cereal crops of Michigan in 1859, 1869, and 1879, as given in bushels in the Census tables of 1860, 1870, and 1880, were as follows:

Crops.	1860.	1870.	1880.
Wheat	8,936,338	16,265,778	35,582,543
Rye	514,129	144,508	294,918
Oats	4,036,980	8,954,466	18,190,792
Indian corn	12,444,676	14,096,228	32,461,452
Buckwheat	529,916	436,755	413,062
Barley	307,868	824,558	1,204,316
Totals	26,169,907	40,722,293	88,097,084

According to statistics given in the annual report of the Secretary of State, about nine-tenths of the wheat crop of 1878 was raised in the four southern tiers of counties, which contained 88.43 per cent. of all the acres planted. Twelve counties in that year produced from 1,011,283 to 1,571,470 bushels of wheat each. These were located in the Kalamazoo, Grand, and Huron river valleys. According to the same authority, the total yield of corn in 1878 was 36,663,299 bushels; of which 33,565,216

bushels, or eleven-twelfths of the whole, were produced in the southern four tiers of counties. Fifteen of these (corresponding, for the most part, with the heaviest wheat-growing sections), raised from 1,004,403 to 2,750,883 bushels each. The barley and oat crops are nearly all obtained in the four southern tiers of counties, but much the largest proportion is raised on the eastern side of the State. St. Clair county produced 120,744 bushels of barley in 1878, which was more than double the barley crop of any other county except Oakland, which raised 67,315. These two counties, and the adjacent ones of Washtenaw, Macomb, Sanilac, and Lapeer, together, raised nearly half of the entire crop. About nine-tenths of the hay is mown from the great corn, wheat, and barley region.

Michigan potatoes are noted for their excellence, being almost free from potato rot, while, owing to the climate and soil, they mature thoroughly, are dry and mealy, and of excellent flavor. The crop reported by the Agricultural Bureau, for 1879, was 10,994,900 bushels, which, in proportion to the total number of acres under the plow, was by far the largest amount raised in any of the Western States. Its value was $4,653,304. Three-fourths of the crop is raised south of the Grand and the Saginaw rivers; but the area of this product edges far beyond the present wheat and corn belt, all of the Lake counties, both on the Huron and Michigan side, and at least two counties north of the Saginaw and Grand, producing from 20,000 to 90,000 bushels of potatoes each. In 1870, the hop yield was 828,269 pounds. It increased rapidly until 1877, since which the attention given to this crop has waned. Flax growing, for seed and fibre, is gradually increasing. It is not engaged in extensively. No less than 641,061 bushels of peas and 166,465 bushels of clover seed were garnered in 1878. There were 94,686 gallons of sorghum syrup, 23,637 gallons of maple syrup, and 1,781,855 pounds of maple sugar produced in Michigan in 1870; and since then, the annual product has nearly doubled. Honey and beeswax are produced in moderate quantities.

In 1878 the orchards of Michigan covered, 229,263 acres in apples, yielding 3,944,206 bushels actually sold; 10,771 acres in peaches, yielding 107,244 bushels sold; besides large quantities of both these fruits for home consumption. The vineyards and gardens sent to market 1,014,950 pounds of grapes, and 100,493 bushels of cherries, plums, currants, and berries. The great

bulk of the fruit is raised in the southeastern and southwestern corners of the State—Berrien and Van Buren leading in the southwest, and Oakland and Lenawee in the southeast. The total value of the orchard products of Michigan, according to the Census of 1870, was $3,447,985; in 1880 it was about $5,000,000.

Hon. William Jenney, Secretary of State for Michigan, remarks that the best wheat counties have, in nearly every case, the largest number of sheep and other farm animals, which he accepts as evidence that flocks and herds contribute very materially to the fertility of the soil. The following table shows the total number of farm animals in Michigan, their value per head, and the total annual valuation, averaged for five years:

Farm Animals.	Number in February, 1870.	Annual number of animals averaged for 5 years ending January, 1880.	Price per head avg. for 5 yrs. ending Jan., 1880.	Total annual value averaged for 5 years.
Horses	259,000	320,880	$76.32	$24,490,433
Mules	4,000	4,100	89.91	367,642
Oxen and other cattle	370,800	408,800	23.55	9,628,139
Milch cows	315,000	387,760	29.79	11,491,913
Sheep	1,670,000	2,195,400	2.54	5,633,038
Hogs	427,000	525,480	6.01	3,107,393
				$54,641,851

The dairy products of Michigan in 1870 were, butter, 24,400,185 pounds; cheese, 670,804 pounds; milk sold, 2,277,122 gallons. In 1880, these figures had grown about thirty per cent—the butter produced amounting to over 32,000,000 pounds, and the cheese to nearly 1,000,000 pounds. Sheep farming is here an important and rapidly increasing industry. In February, 1880, Michigan ranked fifth among all the States, in the number of sheep, according to the Agricultural Bureau, while the State report gives the number of sheep sheared in 908 townships in 1880, at 1,860,024, yielding 10,139,581 pounds of wool, an average of 5.45 pounds per head.

The poultry and eggs supplied to the domestic and export trade amount to not less than $1,500,000 per annum.

Governor Jerome says: "There are millions of acres of good farming lands in this State unoccupied. The building of the lines of railroad traversing the entire length of the Lower Peninsula, north and south, together with the east and west roads lately completed, and the prospective completion, at an

early day, of the Detroit, Mackinac & Marquette railroad, has opened, or will open, to easy access, a vast extent of unoccupied farming lands."

The State held, on Sept. 30, 1879, 2,801,659 acres of land patented to it for educational and improvement purposes, and received during the following year, 12,101 acres more. Deducting 94,040 acres sold during the year ending Sept. 30, 1880, and 1,739,427 acres reserved for internal improvements and other purposes, the State has now nearly one million acres for sale. In 1880, 250,786 acres of public lands were disposed of in this State by the general government. So it is not only plain to see that there are great inducements to families in search of Western homes and farms of their own, to settle in Michigan, but that the work of occupying new lands is going forward rapidly.

Michigan takes high rank as a manufacturing State. Of its enormous production of lumber and salt I have already written, presenting statistics that are practically indisputable, which, compared with the production of these articles in other States, show that Michigan surpassed any other State in the amount of lumber sawed in 1880, by many hundred millions of feet; and excelled her nearest rival in salt, making very nearly half as much again. In the production of ingot and sheet copper, also, this State stands in the first rank. The conversion of its gypsum, limestones, grit stones, marbles, quartzite, and the residuum of its salt brines into various chemicals, has been mentioned already, as has its large products of cured fish, butter and cheese. Besides these industries there are others in which Michigan engages to the amount of many million dollars every year. First is that of her flouring and grist mills, with a product annually of over $30,000,000. She stands eighth among the iron and steel producing States: having, according to the Tenth Census, 22 establishments, employing $4,175,386 capital, and 3,089 hands, paying $922,597 in wages, consuming material valued at $3,299,420, and turning out products worth $4,591,613. The weight of these products was 142,716 tons in 1880, as against 86,679 tons in 1870—an increase of 64 per cent. in ten years. There were 119,586 tons of pig iron and castings direct from the furnace, and 23,130 tons of rolled iron. Furniture is another manufacture in which Michigan has few peers. Immense quantities of superior walnut furniture are made at Grand Rapids and several other points, not only for the West but for the East,

and at times shipments have been made direct to Europe. Carpentry and building exceeded, in 1880, $6,000,000 in value. The principal other industries are: agricultural implements, boots and shoes, tanned and curried leather, clothing, carriages and wagons, with an annual out put of from two to four million dollars each; and freight and passenger cars, machinery, sash and doors, each amounting to between two and three millions annually. The wool clip of this State is large and of fine quality, and woolen factories are increasing in number and production. There are 131 cotton looms, and 12,120 spindles, which, in 1880, consumed 600 bales of cotton.

The heaviest manufacturing counties, stated in the order of their importance, are: Wayne, including the city of Detroit and its suburbs; Saginaw; Kent, including the second city in the State, Grand Rapids; Muskegon; Lenawee; Bay; Jackson; Genesee; Calhoun; Washtenaw; Kalamazoo; Allegan; Marquette and Berrien—all of which, except Marquette, are in the southern four tiers of counties.

Michigan has the largest number of vessels of any of the Western States. In this respect, it leads Missouri by nearly 200 per cent., and Ohio by nearly 100 per cent., though in tonnage Missouri leads with 148,693 tons to Michigan's 144,989, and Ohio's 144,479. A very considerable foreign commerce is carried on between Michigan and Canada—Detroit and Port Huron being peculiarly well located for such a trade. The total foreign imports at Detroit, for the year ending June 30, 1879, amounted to $1,342,600; at Port Huron, to $1,118,362—in all, $2,460,962; while the domestic exports amounted to $2,475,386 from Detroit, and $5,836,031 from Port Huron—a total of $8,311,417.

The total number of American and foreign vessels entered in the several customs districts of Michigan in the year ending June 30, 1879, was as follows: Detroit, 2,949 vessels, of 236,339 tons burthen; Huron, 905 vessels, of 678,862 tons. The same year, the clearances in the Detroit district numbered 2,852 vessels, of 231,739 tons; Huron, 844 vessels, of 704,743 tons.

The chief canal in the State is the St. Mary's Falls ship canal, about one mile in length, connecting Lake Superior with the Lower Lakes. The largest amount of business ever accomplished by it was done in 1880, when the tonnage passing through it aggregated 1,734,890, producing a revenue of $44,552, at cost of $23,437 for current expenses. It is owned by the State; but

arrangements have been made to transfer it to the United States, in consideration of enlargements to be made, and the stipulation that the navigation shall be forever free. A canal about two miles long connects Portage Lake and the west shore of Keweenaw promontory.

Below, I give a list of Michigan steamers of several descriptions, compiled from the Census of 1880:

Description.	No.	Tonnage.	Value.	Crews.
Passenger	58	20,654.80	$1,382,000	655
Freight	56	27,642.29	1,645,500	719
Tow	177	98,850.84	1,040,500	919
Yachts	83	1,516.59	168,850	220
Ferry	17	2,971.66	296,000	88
Totals	391	146,636.18	$4,534,850	2,792

The first charter for a railway in Michigan was granted in Territorial times by the legislative council. This was in 1832, for a road from Detroit to the mouth of the St. Joseph river, now a part of the Michigan Central. Very little progress was made in the work of construction until some years later, when the State undertook the burden of internal improvements. In 1846, after heavy expenditures, becoming financially embarrassed, the State sold this and other roads in which it was pecuniarily interested to private corporations. Up to this time, the Michigan Central was completed only to Kalamazoo, and the Southern Michigan to a point near Adrian. With the completion of these roads, a few years later, the development of Michigan was greatly quickened. According to the report of the Commissioner of Railroads, the length of all the railroads and branches owned in the State in 1879, was 5,358½ miles, against sixty-three miles in 1838; the length of roads operated was 3,657.74 miles—a gain of 343 miles in five years—besides double track and sidings amounting to 1,579 more. In 1880, according to the message of Governor Jerome, 260 miles of new road were added. The entire cost of roads and equipment was $154,426,723. The capital amounted, Jan. 1, 1880, to $104,266,695, and the funded debt to $105,802,008. The roads are improving financially; yet twenty-nine out of forty-nine of them are unable to pay their interest obligations after paying their current expenses. In

1879, the total income of Michigan railroads from all sources was $46,619,207 (an increase of $3,582,960 over the income of 1878); total operating expenses, $26,906,685 (an increase of $1,272,950). The total number of passengers carried was 11,055,617 (equal to one passenger carried 447,402,592 miles—(or five times the distance from the earth to the sun), at 2.45 cents per mile. The freight carried amounted to 24,248,899 tons (equal to 3,598,676,485 tons carried one mile), at 1.05 cents per mile. Three of these roads—the Michigan Central, the Lake Shore & Michigan Southern, and the Northwestern & Grand Trunk—are parts of three grand through routes between the Northwest and the seaboard. The Detroit, Grand Haven & Milwaukee road crosses the entire State, and runs in connection with a line of steam vessels to Milwaukee. The Detroit, Lansing & Northern is pushing from Detroit northward towards the Upper Peninsula, while the Grand Rapids & Indiana road has advanced rapidly in the same direction, to Petoskey, on Little Traverse Bay; and the Chicago & West Michigan is winding its way along the east shore of Lake Michigan towards Grand Traverse. In 1873, the State legislature made a grant of ten sections of land to the mile to aid in the construction of a railroad from the city of Marquette to the Straits of Mackinaw. This was increased to sixteen sections per mile, and the road is now nearly completed.

In 1880 there were 211 insurance companies authorized to do business in Michigan, of which fifty-two are incorporated under State laws, 112 are incorporated in other States, and twenty-three in foreign countries. The stock fire insurance companies wrote risks amounting to a total of $1,523,454,000, received $20,661,480 in premiums within the State, and paid losses amounting to $11,457,967. The fire insurance companies had a "surplus as regards policy holders," of $78,892,000, and the life companies a surplus of $61,776,860. For banks, see page 56.

The total assessed valuation of the State for 1876, upon which the State tax for subsequent years has been levied, was $374,841,031. The value as equalized by the Board of Supervisors slightly exceeds this, being $386,877,103. The State Board of Equalization sets it in round figures, at $630,000,000. From schedules returned from every county in the State, it is probable that real estate is assessed at about 70 per cent. of its value. The amount of State school tax for 1880 was $390,410;

the amount of State tax for all other purposes, $424,421; the amount of school district tax, $2,074,683.

The State finances are in flourishing condition. The receipts from all sources for the year ending Sept. 30, 1880, aggregated $5,019,134, and the expenditures were $3,840,832. Governor Croswell, on retiring from office in January last, said: "For the first time in a great many years, we close the fiscal year with money in the treasury sufficient to meet all the appropriations, and with a balance to the credit of the general fund." The total amount of the bonded debt is $905,149.97, of which $23,149.97 is past due and draws no interest; $591,000 falls due in 1883; and $290,000, in 1890. The amount in the treasury derived from the sinking fund is largely in excess of the sum required to cancel these bonds; but, as the bonds have not matured, the holders decline to accept payment, although coupled with a liberal offer of bonus. The excess of the sinking fund already amounts to $318,895, which, by constitutional provision, goes to the "Primary School Interest Fund," as the entire receipts on account of this fund, from this time forth, must do.

According to the Census, the local and State indebtedness, in 1880, was as follows:

Classification.	Bonded Debt.	Floating Debt.	Gross Debt.	Sinking Fund.	Net Debt.	Net Debt per Capita.
County	$ 670,300	$ 26,200	$ 696,700	.....	$ 696,700	$ .55
Town-ship	349,846	279,257	629,105	.....	629,105	.....
School district	1,251,502	90,061	1,339,573	.....	1,339,573	.....
City and town*	6,359,401	92,599	6,452,000	$543,734	5,857,269	10.81
Total local	$8,897,143	$454,725	$9,351,878	$ 543,734	$8,803,144	$ 5.26
State	905,149	.....	905,150	1,905,895	.....	.....
Total State*	$9,802,293	$454,725	$10,257,028	$1,737,629	$8,499,309	$ 5.19

Below, I give the bonded debt of cities with a population of 7,500 and upwards:

Ann Arbor	$ 16,000	Kalamazoo	$ 25,000
Adrian	59,400	Lansing	105,400
Bay City†	436,270	Muskegon	180,000
Detroit	2,811,400	Port Huron	350,800
East Saginaw	610,475	Saginaw City	202,800
Flint	83,500		
Grand Rapids	471,000	Total	$5,546,045
Jackson	184,000		

* The total population of the cities and towns, the debt of which is here given, was 555,023; and the population of the State, 1,636,936.

† I have no information regarding dates of issue and maturity of bonds of Bay City.

These bonds draw interest at the rates here named:

10	per cent.	$ 598,270
8	"	1,822,300
7 3-10	"	16,000
7	"	2,529,475
6	"	315,800
5½	"	1,000
5	"	8,000
4	"	230,000
Total		$5,530,845
Amt. of debt of Bay City upon which rate of int'st is unspecified		25,200
Total		$5,546,045

The dates of issue and maturity are as given below:

Amounts Issued in Years Named.		Amounts Maturing in Years Named.	
Previous to 1860	$ 451,475	Unspecified	$ 436,270
		1880	173,975
		1881	148,000
		1882	110,700
		1883	217,300
1860	50,000	1884	133,800
1861	24,000	1885	202,200
1866	80,500	1886	229,000
1867	63,300	1887	197,900
1868	256,000	1888	372,100
1869	340,900	1889	327,500
1870	413,000	1890	287,500
1871	110,000	1891	146,400
1872	366,000	1892	184,000
1873	909,500	1893	564,500
1874	584,800	1894	211,000
1875	617,000	1895	252,000
1876	329,000	1896	129,000
1877	93,900	1897	74,900
1878	86,000	1898	83,000
1879	293,400	1899	224,000
1880	41,000	1900	121,000
Unspecified	436,270	Subsequent to 1900	760,000
Total	$5,546,045	Total	$5,546,045

The following table shows the outstanding bonded debt of cities over 7,500, the amounts issued for the purposes named, and rates of interest drawn:

Bridges	$ 23,000	Refunding old debt	$ 101,800
Cemeteries	10,000	Schools and libraries	338,600
Fire department	28,300	Sewers	561,500
Funding floating debt	29,900	Streets	88,500
Improvem'ts harbors, rivers, etc.	67,000	Unspecified	34,145
Parks and public places	200,000	Water works	3,200,000
Public buildings	776,400		
Railroad and other aid	146,900	Total	$5,546,045

Each of the cities, except Ann Arbor, Adrian, Flint, and Lansing, has bonds outstanding, issued for the construction of water works. Detroit has $1,451,000 out for this purpose.

I next make a comparison of the increase or decrease of population of the cities of 7,500 inhabitants and over during the last three decades, show the assessed and estimated true value of real estate and personal property in 1880, and state the total tax levy and the total bonded and floating debt, as follows:

Cities	Popul'n 1880.	Popul'n 1870.	Popul'n 1860.	Total Assess'd Value of Real Estate and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of Real and Personal Property.	Taxation. Total Levy	Total Bonded and Floating Debt.
Adrian	8,218	8,486	7,841	$ 1,584,315	$ 1,[illegible]	$ 2,[illegible]	$ 68,796	$ 50,400
Ann Arbor	5,094	7,226	6,061	1,449,227	1,[illegible]	1,650,814	54,905	16,000
Bay City	1,696	7,064	20,696	7,651,130	8,964,725	8,496,312	142,005	422,100
Detroit	45,619	79,577	116,342	86,196,040	95,206,490	112,744,560	1,217,291	2,611,469
East Saginaw	9,001	11,250	19,016	7,580,080	8,500,[illegible]	8,797,901	185,635	611,055
Flint	2,090	8,836	6,410	2,[illegible]	3,[illegible]	4,361,781	53,199	68,500
Grand Rapids	8,054	16,507	22,015	8,[illegible]	10,192,727	24,256,[illegible]	260,286	471,000
Jackson	4,799	11,447	16,105	2,142,200	5,[illegible]	7,479,[illegible]	110,040	184,000
Kalamazoo	6,070	9,151	11,937	4,456,420	4,456,[illegible]	5,941,[illegible]	74,408	25,000
Lansing	3,074	5,241	8,319	4,041,970	3,961,150	5,851,[illegible]	81,648	105,400
Muskegon	1,450	6,026	11,262	1,411,445	2,458,257	3,271,145	71,195	180,000
Port Huron	4,371	5,973	8,626	1,[illegible]	1,155,201	1,580,[illegible]	[illegible]	[illegible]
Saginaw City	1,699	7,460	10,525	4,610,000	3,[illegible]	4,919,[illegible]	[illegible]	[illegible]
Totals	94,107	180,980	279,409	$122,521,703	$144,[illegible]	$188,[illegible]	$3,604,310	$5,[illegible]

The rates of taxation in each of the above cities was, therefore, in Adrian, $4.28; in Ann Arbor, $3.79; in Bay City, $1.85; in Detroit, only $1.46; in East Saginaw, $2.43; in Flint, merely $1.21; in Grand Rapids, $4.31; in Jackson, $5.14; in Kalamazoo, $1.67; in Lansing, $2.02; in Muskegon, $4.95; in Port Huron, $6.85; and in Saginaw, $1.86.

The social condition of Michigan is revealed in the very general distribution of property, the comfortable homes of the industrial classes, its broad and liberal State educational provisions, its excellent penal, reformatory, and benevolent institutions, and in the comparative rarity of pauperism and heinous crimes within its borders. Very early in its Territorial history, before congressional grants of any kind were available, a system of public schools was provided. In the same spirit the foundations of the State University were laid in early times—an institution which has grown with remarkable vigor, until now it stands, in many respects, among the first universities of the entire country. The attendance in the year ending June 30, 1880, numbered 1,430; of whom 448 were in the department of literature, science, and arts, 423 in the medical schools, 395 in

the college of law, 81 in the school of pharmacy, and 83 in the college of dentistry. Michigan initiated the policy in this country of establishing State agricultural colleges, of which it has one at Lansing, with an accumulated fund of $153,137. This is recognized as one of the most successful of this class of institutions; graduating, in 1880, twenty-six students. The State Normal School, at Ypsilanti, is doing a good work in the preparation of teachers for the public schools. The principal statistics relating to the common schools are given in the following table, taken from the final message of Governor Croswell to the Legislature:

Items.	1879.	1880.
Whole number of children between 5 and 20 years of age	486,998	506,231
Whole number of children enrolled in public schools	342,138	362,556
Percentage of attendance	70.2	71.6
Estimated number not attending any school	122,609	120,811
Whole number of graded school districts	358	389
Whole number of ungraded school districts	5,899	5,963
Total number of school districts	6,253	6,352
Whole number of school houses	6,335	6,400
Whole number of teachers employed	13,616	13,949
Total cost for instruction (teachers' wages)	$1,880,945.24	$1,917,983.99
Total expenditures during year	3,064,638.88	3,109,915.14
Number of teachers' institutes held	56	65
Total enrollment at teachers' institutes	4,144	4,482
Amount of county institute fund expended	$5,313.03	$6,667.49
Amount of aid from State treasury to institutes	1,748.46	1,800.00
Total expense of institutes	7,061.49	8,467.49

Michigan has set a noble example to the world, in providing homes and moral, intellectual, and industrial instruction for neglected and dependent children. While saving these innocent unfortunates from the sufferings and temptations of destitution, it preserves them from the debasing influences of poor houses and reform schools, and educates them for useful citizenship. No wonder that the State Public School, at Coldwater, Michigan, has attracted the attention of some of the greatest statesmen of Europe, and been held up to the senates of the Old World as a model worthy of imitation. Besides the institutions above named, there are two State asylums for the insane, an institution for the deaf and dumb, another for the blind, a State reform school for girls, another for boys, a State house of correction for adults guilty of light offenses, and a peculiarly well managed State penitentiary. Indeed, all of these institutions appear to be conducted in an enlightened and liberal spirit.

The ratio of church sittings to the population was not nearly so great in Michigan in 1870, as in Ohio and Indiana; but the ratio has rapidly increased, and there are few settled communities which are not regularly ministered to by some religious denomination. The Methodists own rather more than one-fourth of the church accommodations; the Baptists and Roman Catholics, each not far from one-sixth; the Presbyterians about one-ninth; and other denominations the remainder.

Newspapers are published in seventy-two of the seventy-six counties of the State. In all, there are 418 papers, of which thirty-three are daily, three tri-weekly, four semi-weekly, 354 weekly, three bi-weekly, four semi-monthly, fourteen monthly, one bi-monthly, one published every six weeks, and one quarterly. The thirty-three daily papers issue 20,417,232 copies annually, besides 8,279,308 copies in their weekly, semi-weekly, tri-weekly, and Sunday editions. The leading papers of Detroit, Grand Rapids, Lansing, Saginaw, Bay City, and other principal cities, have contributed very materially to the present enviable educational, economic, and financial condition of the State.

Any one who has followed me in the foregoing survey of Michigan should now see the Lower Peninsula lying before him like an outstretched palm of plenty, the wrist upon the Indiana line, the thumb at Point Aux Barques, grasping the wealth of Saginaw Bay, and the fingers at Mackinaw Straits, touching, as it were, all the commerce of the Upper Lakes. In the palm itself, formed by the counties south of a line drawn from the mouth of Saginaw river to the mouth of the Muskegon, including scarcely a third of the State, are its granaries, its orchards, vineyards, and gardens, its flocks and herds—more than three-fourths of the whole product. Here are nearly four-fifths of the entire population of Michigan; all but five of its twenty-six cities of more than 5,000 inhabitants, and all of its cities of more than 10,000 population: here are its principal manufactories, more than three-fourths of its railways, and much the greatest proportion of its total assessed value of real and personal property. North of this, from shore to shore, wave the immense forests (the reserve fund of that extensive lumber trade I have described), indented here and there with the clearings made around the lumbering villages, and slightly checkered with the pioneer farms that are to expand until, in time, they supplant the forests with richer products. When one takes note of the highly

productive farms along the tributaries of the Grand and the Saginaw rivers, on what were once pine lands, it requires no gift of second sight to foresee, in the near future, a time when Alpena, on the Huron coast, and Manistee and Ludington, on the Michigan shore, on the mere selvedge of this broad wilderness, will not be, as now, the only cities of over 5,000 inhabitants in an area of more than 10,000,000 acres. This region, so varied in soils, so pleasantly diversified in surface, so favored above other districts of North America in the same latitude in climate, must, in the course of reason, soon begin to teem with population, and grow vocal with the song of the reapers, and the hum of lathes and spindles. Still northward, along the southern shore of Lake Superior, where now only Marquette and (a little farther inland) Ishpeming can claim to be cities of over 5,000 inhabitants, as the treasures of the mines and quarries and forests are developed, another decade must record a much greater growth than the past. The first railways from the south have but recently pierced to these regions, where, in some parts, the post is still carried to the lumbermen in saddlebags in summer, and by Indian runners on snow-shoes in the winter. When the mines, that now produce one-fifth of the entire iron ore of the United States, and the copper beds, that, between 1845 and 1878, despite all initiative mistakes and discouragements, yielded no less than 253,035 tons of ingot copper, which sold for $123,394,000, shall be cleft open in a thousand new places by the fiercer onsets of capital and mining skill now attracted towards them; and when the extensions of the Michigan and Canadian railway systems along the south shore of Lake Superior are completed, as there is every reason to believe will soon be the case—then Upper Michigan will contribute largely to the general prosperity and happiness of this favored commonwealth.

CHAPTER VIII.

STATE OF WISCONSIN.

WISCONSIN lies immediately north of Illinois, bounded on the east by Lake Michigan; on the northeast by Green Bay and the Upper Peninsula of Michigan; on the north by Lake Superior; and on the west by Minnesota and Iowa, where the Mississippi and St. Croix rivers, and St. Croix Lake, constitute the dividing line most of the way. It has an area of 56,040* square miles, or 35,865,600 acres, measuring 302 miles in length north and south, and 258 miles in breadth. In latitude, it lies between 42° 30′ and 47° 6′; the latter parallel passing through the northernmost of the Apostle Islands, and the former making the common boundary of Wisconsin and Illinois. In longitude, it extends through six degrees, from the meridian of 86° 53′ to that of 92° 53′ west of Greenwich, excluding the islands at the entrance of Green Bay, which extend about 20′ farther east.

The general surface of the country is level or undulating, except in the Lake Superior region, where, in places, it assumes an almost mountainous aspect, with rough, broken ridges rising to heights of 1,750 to 1,800 feet in Lincoln and Ashland counties, and receding gradually in elevation towards the lake shore and the Minnesota line. This semi-mountainous region separates the tributaries of Lake Superior from those of the Mississippi. Another very uneven section of the State adjoins the broken country of the Menominee iron region of Upper Michigan, in the northeast. A third line of elevation, starting between the Menominee and the headwaters of the Wisconsin, runs to the south, skirting the latter river, and sending off a branch that bears eastward of the sources of Rock river and Fox river of the Illinois, forming the water-shed between Lake Michigan and the basin of the Mississippi. In places, the summits of these ridges are from 900 to 1,000 feet in height. As the general

* Statistics of the Tenth Census. The Annual Report of the Commissioner of the General Land Office states it at 56,094 square miles, or 34,811,360 acres.

level of the State is between 500 and 600 feet above the sea, and many of these rise quite abruptly above this level, picturesque in form and forest vesture, they do much to enhance the charms of Wisconsin scenery—many of whose landscapes are of striking loveliness. In the southwestern corner of the State, in the lead region, there are several isolated knobs, or mounds, overlooking the adjacent country from elevations of 570 to 1,100 feet. Sinsinnewa Mound, east by north from Dubuque, is one of these. Platte Mound, in the same county, is another; and the mounds around and to the southwest of Madison, in Dane county, are of the same description. Of the latter, Blue Mound reaches an altitude of 1,729 feet above tide-water.

As denoted by the natural drainage, about four-fifths of which flows to the Mississippi, the general inclination of the surface of Wisconsin is towards the south and southwest. The Wisconsin, the largest of the interior rivers, is a fine, broad stream, navigable about 200 miles, to Portage City. It rises in Lake Vieux Desert, on the Michigan boundary, not far from the central meridian; flows southerly to Portage City; and thence southwesterly to the Mississippi, at a point about fifty miles above the Illinois line—in all, about 600 miles—dividing the State into two almost equal parts. The St. Croix, rising a few miles south of Lake Superior, in Bayfield county, flows southwest nearly fifty miles, to the Minnesota line; and thence southwest and south, about 110 miles, to the Mississippi. It is navigable fifty-four miles, to the Dalles of the St. Croix. Between the St. Croix and the Wisconsin, the Mississippi receives from this State the Chippewa, Buffalo, Trempealeau, and Black. East of the Wisconsin, in the central counties, rises Rock river; a little farther east and south, Fox river of the Illinois; and east of this but a few miles, the Des Plaines, another tributary of the Illinois river. The principal river of the Michigan slope is the Neenah, or Fox river of Green Bay, which, through a canal of less than two miles in length, at Portage City, connects Green Bay and Lake Winnebago (the largest interior lake of the State, some ten miles broad and twenty-eight miles long) with the Wisconsin. Next in importance on this side, is the Menominee, for a considerable distance the common boundary of Wisconsin and Upper Michigan. The Sheboygan, Milwaukee, Manitowoc, Kewaunee, and Two Rivers are all small tributaries of Lake Michigan; but their mouths, as recently improved, make excel-

lent harbors. The Lake Superior slope is a narrow strip of highland descending rapidly to the lake. The principal streams are the Montreal, Bad, Bois Brule, Left Hand, and St. Louis rivers. None of these are of great length; and all of them are full of rapids, or cascades, over which they foam and plunge at the rate of 500 to 800 feet, within distances of from thirty to forty miles, in their swift descent to the lake. In all, according to the best topographical maps, without enumerating several hundred petty lakelets and creeks, Wisconsin has eighty-four rivers, seventy-four lakes, and twenty-seven creeks of considerable size, besides the navigable waters which make the greater part of its boundaries, washing a coast of 350 miles on Lake Michigan and Green Bay, 120 on Lake Superior, and about 300 on the Mississippi and St. Croix.

The geological formations of Wisconsin range upwards from the Laurentian and Huronian rocks in the northeastern and north central parts of the State, and the copper-bearing series of igneous rocks pushing up through the Superior sandstone along the northwestern border, through the Potsdam sandstone (of immense thickness), in the central portion of the State, then through the Lower Magnesian sandstone, forming a narrow, irregular belt south of the latter, and the St. Peter's sandstone, still further south, to the Trenton limestone, which covers a broad band through the east, central, and southwestern counties, and the Galena limestone, filling the southwestern angle, the principal lead and zinc bearing section of Wisconsin. There are limited areas in which the formations of still later origin appear. Rocks of the Cincinnati group come to the surface in the eastern counties, and are discovered in the elevated mounds of the southwest. The Clinton group appears in the Iron Ridge district, where "seed iron ore" is found in abundance. Niagara limestone overlies a considerable portion of the lead region. The Lower Helderberg is found in one or two small tracts east of Fox river, and the Hamilton group of the Devonian formation appears near Milwaukee. Finally, over the greater part of the State are distributed the deposits of the drift and alluvial periods, varying from only a few feet to hundreds of feet in depth. Wisconsin is rich in mineral deposits. Iron abounds. Lead and zinc are produced in considerable quantities in Southwestern Wisconsin, where for nearly sixty years lead has been mined with success. The greatest production was from 1840 to

1847. Of late years the lead ore mined has averaged about 11,000,000, and the zinc ore over 30,000,000, pounds per annum. Copper, silver, and gold exist; but only copper promises to pay for mining.

The surface of Southern Wisconsin, like that of Northern Illinois, consists principally of prairie, diversified with hardwood groves and oak openings. The woodlands grow in extent and density towards the north until the prairies entirely disappear, and the whole face of the land is wrapt in almost impenetrable forests of pine, beech, cedar, spruce, and hemlock, fir and balsam, intermingled with hardwood trees of various species. The State is rich in flora: more than sixty species of native forest trees, about 150 shrubs, 100 grasses, and not less than 1,200 other plants have been catalogued. The forests of the State have long been a source of immense wealth; and the products are increasing annually. The lumber product of the Wisconsin pineries in 1880, omitting railroad ties, split, hewn, and round timber, and immense quantities of cord-wood, was 1,248,315,898 feet of lumber, 696,310,000 shingles, and, irrespective of the Green Bay and Michigan shore, 147,530,325 laths. I have compiled the following table from specific statistics, procured mainly from the *Northwestern Lumberman*, of Chicago, a high authority on this subject, showing the lumber and shingle manufacture of Wisconsin for 1880. The lath product, in the last column, is compiled from figures given by the St. Paul *Pioneer Press*:

Lumber Districts.	Lumber Sawed in 1880.	Shingles Sawed in 1880.	Lath Sawed in 1880.
Mississippi river	7,504,000	1,577,000	.....
Chippewa river	330,633,000	87,926,000	87,346,325
Black river	128,280,000	46,119,000	14,424,000
Wisconsin Valley Railroad	141,903,000	81,300,000	.....
Wisconsin Central Railroad	143,296,000	98,700,000	45,760,000
Wolf river	150,218,000	144,411,000	.....
Miscellaneous mills	149,440,000	105,280,000	.....
Lake Superior	14,138,000	8,960,000	.....
Green Bay, below Menominee	169,090,898	122,097,000	.....
Totals	1,248,315,898	696,310,000	147,530,325

The fauna of this State includes, according to the catalogue of the late Dr. I. A. Lapham, sixty-two native species of mammals, over 300 of birds, nineteen of reptiles, and one

hundred of molluska. Nowhere else between the Alleghanies and the Mississippi can the sportsman find such variety and abundance of game as in Wisconsin and Upper Michigan. Bears, beavers, deer, occasionally elk, the wolf, wild-cat, otter, muskrat, mink, and porcupine; the American lynx, grouse, woodcock, quail, partridge, snipe, wild goose, duck, teal, and pigeon; the bald and the golden eagle, swans, pelicans, hawks, and owls—are all found in the forest regions; while the great lakes and the transparent inland rivers and lakelets gleam with fish of the finest fresh-water varieties. Whitefish and trout are taken in great quantities along the lake shore, and constitute an article of export of growing importance; perch and sturgeon, pickerel, muskallonge, bass, and brook trout, abound; a peculiar fish, the cisco, is found in a few of the interior lakes; and the fish common to the Upper Mississippi are taken in Central and Western Wisconsin in considerable quantities. The rare opportunities afforded for the delights of gun and angling rod, and the deliciousness of the summer climate of Wisconsin, attract thousands of health and pleasure seekers every season.

The climate of this State, taken the year through, is subject to great extremes, notwithstanding the modifying influences of such immense adjacent bodies of water as Lakes Superior and Michigan. According to a series of observations made at the State University at Madison, at La Crosse, at Milwaukee, and at Duluth, the range of annual temperature, from the minimum of winter to the maximum of summer, varies from 106° to 120° in different portions of the State; the lowest being twenty-five degrees below zero at Madison, nineteen at La Crosse, eight at Milwaukee, and twenty-one at Duluth. The mean temperature for the year was 41.8° at Madison, 45.9° at La Crosse, 45.8° at Milwaukee, and 39.4° at Duluth. In the chart of the United States Signal Service, given in the Statistical Atlas of the United States, showing the mean temperature of the hottest week of 1872, the isotherm of 85° Fahrenheit passes through Wisconsin nearly in a line from Milwaukee to Prairie du Chien, and that of 80° across the northern verge of the State; while, during the coldest week of the following winter, the isotherm of zero included a small segment around Milwaukee, and nearly the entire State lay between this isotherm and that of 10°. The annual rainfall varies from about twenty-four inches in the southern counties to thirty-one in the central tier, stretching

from Milwaukee to La Crosse, and thirty-five inches on the Superior coast. It is, usually, seasonably distributed throughout the year.

The vital statistics of Wisconsin vouch for its salubrity. Any other evidence than these, as recorded in the Statistical Atlas of the United States, and contained in the official reports of State officers, is unnecessary; but, after all, the popular impression created by the steady increase from year to year of the number of health seekers from other portions of the country, gathering in this State to enjoy the restorative influence of its climate, will do more than anything the scientist can say to extend its reputation as a healthful State.

Wisconsin is the last of the five States carved out of the old Northwest Territory. It is claimed that John Nicollet, one of the most daring of the early French explorers of North America, visited Green Bay as early as 1634; only ninety-nine years after Cartier made the first settlement in Canada, and but fourteen years later than the settlement of Plymouth, Mass. But the first fixed residence secured by Europeans within the limits of Wisconsin, so far as positive records go, was by the Jesuit missionaries, who initiated their work of converting the Indians of this region, at and opposite La Pointe, Lake Superior, in 1665, and established a mission station on Green Bay four years later. It was from this latter station that Father Marquette and M. Joliet, before another four years had passed, set forth by way of Green Bay, Fox river, and the Wisconsin, to explore the unknown wilderness beyond, on that memorable expedition which resulted in the discovery of the Upper Mississippi, at the mouth of the Wisconsin, June 17, 1673. Gradually, around this mission chapel and school, the natives and the French fur seekers from Canada came together to trade. The traders built storehouses and stockades to defend them; and a few of them took Indian wives and spent much of their time here. But, with the exception of the missionaries, most of the Europeans and Canadians in this community came and went as mere adventurers; their families, if they had any, dwelling in Canada. The number of Europeans increased but slowly. More than a century passed before the settlements at Prairie du Chien were begun, in 1783. About the beginning of the present century, the excitement occasioned by rich discoveries of lead near Galena and Dubuque led to the prospecting for this mineral in the south-

western corner of Wisconsin, and finally to certain settlements there, at Mineral Point, and other places. These may be regarded as the first Anglo-American settlements of this State. For a period of ninety-two years, from 1671 to 1763, the French claimed all of Wisconsin as a part of New France; although, in fact, the country was in possession of independent aboriginal tribes, and the jurisdiction of the French, down to the end of their sway, was restricted mainly to a few forts, or stockades, and their immediate surroundings. The British held similar possession of the country for the next thirty-three years, doing really nothing to settle or civilize it, and not even surrendering it to the United States until 1796, although it was included within the terms of the cession of 1783, embracing all the country east of the Mississippi and south of the Great Lakes to the Spanish possessions of Florida and Louisiana. From 1796 until the organization of Ohio into a Territory, at the opening of the year 1800, Wisconsin constituted a part of the Northwest Territory. From that time until it acquired a separate Territorial organization of its own, the civil transfers of Wisconsin made it a portion of Indiana Territory from 1800 to 1809; then a part of Illinois Territory, from 1809 until 1818, when Illinois became a State; then a part of the Territory of Michigan until 1836, when Michigan entered the Union, and Wisconsin Territory was organized, July 3, 1836, under the Act of Congress of the twentieth day of the preceding April. All of what is now Iowa and Minnesota was for a time included in this Territory. During the century and a half of nominal French, English, or American domination of this grand domain, closing in 1821, nothing appreciable was done in the way of reclaiming it from the savage state in which its European discoverers first beheld it. Not until after the powerful stimulus given to the settlement of the Northwest by the introduction of steam navigation upon the Upper Lakes, and the opening of the New York & Erie Canal, did immigration begin to assume noteworthy proportions.

The war with the Sacs and Foxes in 1831–32, known as the Black Hawk war, which originated in Illinois, and extended up the Rock river valley and over all Wisconsin west of that to the Mississippi, was practically ended by the battles of the Wisconsin and the Bad Axe, within the Wisconsin limits. There were few settlers in the Territory at that time; and the effects of that war upon the natives, together with the well-known power of

the general government, have held the Indians in such complete subjection that raids and massacres, or serious troubles of any kind between the races, since that time, have been unusually rare within the borders of this State, and have never served to retard immigration to any appreciable degree. Immediately after the war, the settlement of the country began to advance steadily; and, in 1836, when the first Census was taken, the population of the Territory was 22,214. From this time, the current of immigration gathered volume every year. The Territorial Governors were chosen, with but one exception, from those who had grown up with the country; and the controlling spirits of its legislation were men of sterling sense, unusual political sagacity, and inflexible purpose. This is evinced by the Territorial laws; by the first State Constitution, framed in 1848, and practically unaltered to this time; and by the striking progress made in the development of the commonwealth from that time until now. Wisconsin was admitted to the Union, March 3, 1847. Immediately thereafter, the effects of this change became apparent in a still greater influx of population and capital; and in 1850 the State had 305,391 inhabitants, having increased more than 880 per cent. in a single decade. The population at the five decennial periods from 1840 to 1880 was as shown in the succeeding table:

Census Years.	Totals.	Whites.	Colored.	Native.	Foreign.
1840	30,945	30,745	196	.....	.....
1850	305,391	304,756	635	194,099	110,477
1860	775,881	773,693	2,188	498,954	276,967
1870	1,054,670	1,051,351	3,319	690,171	364,499
1880	1,315,480	1,309,622	5,858	910,063	405,417

Of this population, about half of the adults are engaged in agriculture, which is the leading industry. Rapidly as the population has increased, the products of the field have multiplied still faster. And yet, but a small portion of the State is under cultivation; the total number of acres under the plow, according to the assessors' rolls for 1880, being but 5,223,557, out of a grand aggregate of 35,865,600 acres. Deducting city and village lots, it appears that more than forty per cent. of the entire area of Wisconsin is unassessed.

The rate at which the agricultural growth of the State advances is apparent in the following comparative table of the

principal farm crops, compiled from the reports of the Agricultural Department at Washington, for 1869 and 1879:

Principal Farm Crops.	1869.		1879.	
	Acres.	Bushels, Lbs. or Tons.	Acres.	Bushels, Lbs. or Tons.
Corn	359,848	9,500,000	1,028,400	39,912,600
Wheat	1,568,627	24,000,000	1,632,300	20,565,720
Rye	76,666	1,150,000	187,200	2,806,000
Oats	631,546	22,500,000	888,600	34,668,200
Barley	57,915	1,500,000	160,000	4,320,000
Buckwheat	3,579	68,000	30,600	530,200
Potatoes	44,859	4,800,000	133,900	13,555,800
Tobacco	eport.	No report.	5,300	5,474,900
Hay	1,006,896	1,460,000	852,500	1,227,600

From this it appears, that there was a gain of 185 per cent. in ten years in the corn acreage, with the very surprising increase of 320 per cent. in the yield. There was but a slight increase in the acreage sown to wheat, with an actual falling off in the product. The rye crop increased 143 per cent.; barley, 300; buckwheat, 725; and potatoes, 185 per cent.—over the harvest of 1869; while the oat crop was but fifty per cent. greater.

According to the same authority, the corn crop of 1880 amounted to 40,310,100 bushels; but the wheat crop, owing to unfavorable weather, was little more than half a one in its average per acre, compared with the yield in 1869, being estimated at only 16,464,000 bushels.

The above figures for 1869 and 1879 differ materially from those of the Census Bureau for the same years, as given in the Census returns of 1870 and 1880, here shown in comparison with those of 1860:

Crops.	1860.	1870.	1880.
Wheat	15,657,458	25,636,244	24,884,689
Rye	868,544	1,335,294	2,206,518
Oats	11,059,260	20,180,016	33,905,330
Indian corn	7,517,300	15,083,998	34,220,579
Buckwheat	88,987	408,807	299,107
Barley	707,907	1,645,019	5,043,118
Totals	35,868,856	64,199,568	99,661,326

The richest wheat-growing portion of the State is seen from the following list of ten leading counties, arranged according

to statistics given in the annual report of the Secretary of State for 1880:

Counties.	Bushels.	Counties.	Bushels.
Dodge	1,590,743	Washington	737,210
Fond du Lac	1,085,308	Winnebago	697,690
St. Croix	1,064,461	Pierce	691,628
Dane	764,889	Manitowoc	681,195
Trempealeau	739,275	Columbia	640,359

These eight counties produced more than forty per cent. of the entire crop of Wisconsin for that year.*

The eight heaviest corn-bearing counties the same year were:

Counties.	Bushels.	Counties.	Bushels.
Grant	2,596,577	Green	1,649,833
Dane	2,278,864	Iowa	1,351,099
La Fayette	2,146,549	Walworth	1,281,354
Rock	2,134,848	Columbia	959,210

These eight counties produced but little less than one-half the corn crop of the whole State. They include, also, all that yielded over one million bushels of oats, and together produced about one-third of the whole oat crop of that year. That so large a proportion of these cereals was harvested within so small a fraction of the State was not due to the superiority of the soil over that of many other counties, which are not so thickly settled, or where the attention of farmers has been drawn to dairy farming and other objects. A comparison of the yield per acre plainly shows this. All Southern Wisconsin, with but little exception, and that mostly in the west, is as rich wheat and corn land as Northern Illinois or Southern Minnesota. And in the north, even far up into the timber region, where the climate is too rugged for corn to be a certain crop, the average wheat yield per acre, on lands that a few years ago were covered with pine, equals or exceeds that of some of the counties in the above list. It is very evident, therefore, that, as a grain-growing State, Wisconsin, notwithstanding its corn crop in 1879 was eighty per cent. and its wheat crop ninety-one per cent. larger than the similar crops of New York, has a capacity many fold greater than has

* Both of the last preceding tables are compiled from the assessors' returns, which make the total wheat crop for the year in question 21,040,228, and the total corn crop, 27,580,121 bushels.

as yet been tested. The quality of Wisconsin wheat is not surpassed by that of Minnesota, with which, as a rule, it takes rank in quality. Now and then, in a series of years, untimely frosts injure corn in exposed places; or, as in 1880, unfavorable winters and springs seriously reduce the yield of wheat: and yet the average crops, both of wheat and corn, for several consecutive years, will be found to compare well with those of other States subject to more frequent droughts and floods, and to greater ravages of injurious insects. This statement is substantiated by the following table, showing the total annual yield, in bushels, pounds, or tons, of the principal farm crops, the total estimated annual value of each, the yield per acre, and the price per acre, each averaged for the five years closing with 1879:

Crops.	Total yield of crops of 1880 in bush'ls, pounds or tons.	Average annual yield in bushels, pounds or tons for 5 yrs. ending 1879.	Avg. price per bushel, pound or ton for 5 years.	Average annual value of crops for 5 years ending with 1879.	Av'rge annu'l yield p'r acre fr 5 yrs. ending 1879.	Avg. ann'l value per acre for 5 yrs. ending 1879.
Indian corn.....	9,500,000	29,542,520	$ .39	$10,803,188	31.9 bu.	$13.13
Wheat.....	24,000,000	21,144,024	.91	19,234,359	12.6 "	11.43
Rye.....	1,150,000	2,245,840	.57+	1,275,636	15.8 "	9.21
Oats.....	22,500,000	29,448,240	.27	9,868,012	36.5 "	9.93
Barley.....	1,500,000	3,456,800	.65	2,130,464	26.5 "	17.45
Buckwheat.....	63,000	428,840	.62	260,528	15.1 "	9.38
Potatoes.....	4,800,000	9,356,560	.36+	3,475,087	88.0 "	32.94
Tobacco.....	.....	3,758,300	.09	334,996	797+ "	68.50
Hay.....	1,460,000	1,885,120	7.89	10,912,261	1.44 T	11.07

Compared with similar tables accompanying the chapters on other States, these statistics show that the average annual yield per acre in Wisconsin, for the five years specified, slightly exceeded that of Illinois, Indiana, and Missouri, in corn; and that of Missouri, Nebraska, and Iowa, in wheat. Indeed, in wheat the average yield per acre was about thirty per cent. greater than that of Iowa.

The tobacco of Wisconsin is of good quality, the best of it taking rank in the market with the best Connecticut leaf. This is an industry of recent development in this State. While the tobacco crop of 1870, according to the Census Bureau, was but 960,813 pounds, and the average crop for the five years ending with 1879, according to the Agricultural Bureau, was but 3,456,800 pounds, the Census of 1880 estimates the crop at 10,897,663 pounds. To a large extent, this was raised in Dane, Rock, Jefferson, and Columbia counties; Edgerton, in Rock county, being the focus of the country tobacco trade. In the

quantity of tobacco produced, Wisconsin rose during the last decade from the fifteenth rank among all the States, to the tenth. In the average per acre, it rose to the fifth rank; the yield in 1880 being 1,237 pounds, while the average per acre for the whole country was but 732 pounds per acre. The growing importance of this industry, among the widely varied products of this State, is, therefore, manifest. As a hop-growing State, Wisconsin still ranks second, notwithstanding that the low prices of 1877 and 1878 and the poor harvest of the latter year so discouraged farmers that a great many of them withdrew altogether from the business. Better crops and better prices have revived this industry. In 1879, New York and Wisconsin raised over two-thirds of the crop of the country. The product in 1880 was still greater; and, owing to a bad crop in Europe, the price advanced from five to ten cents per pound, in 1878, to thirty and even forty cents per pound.

The raising of flaxseed has proved profitable, and the product of 1880 amounted to 17,597,859 pounds. Other products were 312,300 bushels of grass seed; 815,688 bushels of root crops; 67,339 bushels* of cranberries, and 718,687 bushels of apples. Other orchard fruits are not reported. The climate is too rigorous for peaches. Cherries and Siberian crab apples thrive finely and yield abundant crops. Pears do moderately well. Strawberries, blackberries, red raspberries, and other small fruits produce well; and immense quantities of them are sold in the Chicago and Milwaukee markets. Wild rice grows in large quantities in the lake regions and along the river margins of the north, and constitutes one of the chief supports of the natives on the Indian reservations.

The value of farm animals increases here faster than the numbers. Much more attention is given to the quality of the stock than formerly. Fat cattle and sheep are raised for the Chicago market, which is within a few hours' travel of the richest farming section of Wisconsin. The reports of the State Agricultural Society show that the finest strains of imported and American blooded cattle have been introduced into this State in large numbers.

The rate of increase of the several kinds of farm animals appears in the statistics of the Agricultural Bureau for 1870 and 1880, as given below:

* Another estimate sets the crop of cranberries in this State, in 1880, at 80,000 barrels, which is probably nearly correct.

Farm Animals.	1870.	1880.	Farm Animals.	1870.	1880.
Horses	275,500	392,100	Milch cows	370,000	458,900
Mules	5,000	8,900	Sheep	1,670,000	1,816,100
Oxen and other cattle	443,800	522,700	Hogs	427,000	571,800

Unquestionably, the most remarkable agricultural growth of the decade was in dairy farming. The amount of butter manufactured in 1880, amounted to 22,708,549 pounds, and the cheese to 16,409,145 pounds. Sheboygan county is now the centre of this industry. The prices of animals have fluctuated less than in States where the home demand was not so large, and the great markets were not so accessible. The table underneath shows the numbers of farm animals and the prices they command in Chicago, averaged for five years—from 1876 to 1880, inclusive:

Farm Animals.	Number in February, 1870.	Numb'r of farm animals averaged for the 5 years ending January, 1880.	Price per head averaged for the five years ending January, 1880.	Total annual value averaged for five years.
Horses	275,500	370,060	$63.66	$23,515,920
Mules	5,000	7,940	80.65	636,474
Oxen and other cattle	443,800	497,060	19.45	9,626,133
Milch cows	370,000	466,760	24.54	11,453,554
Sheep	1,670,000	1,254,540	2.39	2,998,687
Hogs	427,000	589,080	5.66	3,333,709
Totals	3,191,300	3,185,440	.....	$51,513,477

The total annual value of these animals, averaged for five years, reached, last year, the handsome sum of $51,513,000, which, added to the value of the crops given above, averaged in like manner, $58,469,516, increased by the product of poultry and eggs, not less than $2,200,000, makes a grand total of $112,000,000.

The manufacturing interests of Wisconsin, notwithstanding the long financial depression suffered by the entire country during more than one-half of the past decade, have made very encouraging progress. The following tables, compiled from the census reports of 1870 and 1880, present a fair comparison of the number of establishments, the capital and average number of hands employed, the wages paid, the value of the materials consumed, and the estimated value of the products of seven of the chief manufactures of this State at the beginning and at the close of the last decennial period. The first of these tables is compiled from the census of 1870:

Business.	No. Establishments in 1870.	Capital.	No. of Hands Employed.	Total Amt. Paid in Wages.	Materials.	Products.
Agricultural implements	88	$ 1,494,700	1,397	$ 693,382	$ 995,720	$ 2,295,425
Carriages and wagons	425	1,254,470	2,134	722,705	910,150	2,596,594
Flouring and grist mill products	531	6,574,600	2,261	666,647	17,075,979	20,419,977
Iron manufactures, in all branches	61	1,623,500	2,259	933,010	1,914,474	3,200,038
Leather curried	70	407,300	658	195,729	2,010,060	2,260,347
Leather tanned	65	906,184	977	339,010	1,473,143	2,013,088
Lumber sawed	719	11,448,345	12,456	3,754,793	7,488,306	15,139,869
	2,108	$25,709,061	21,432	$7,174,402	$31,897,860	$46,125,171

The statistics of these same industries in 1880 were as follows:

Business.	No. Establishments in 1880.	Capital.	Aver. No. Hands Employed.	Total Amt. Paid in Wages.	Materials.	Products.
Agricultural implements	110	$ 4,009,095	2,300	$1,080,887	$ 1,360,982	$ 4,218,674
Carriages and wagons	122	2,446,912	2,208	1,008,049	2,114,267	5,736,797
Flouring and grist mill products	702	8,830,985	2,407	904,543	24,695,893	28,515,977
Iron manufactures, all its branches	85	5,005,763	4,498	2,098,880	5,508,143	10,004,982
Leather curried	61	1,389,496	658	251,412	2,772,914	4,496,729
Leather tanned	73	1,997,886	815	337,211	3,367,355	4,234,431
Lumber sawed	684	16,270,989	17,022	4,160,840	9,590,777	17,381,417
	1,987	$41,610,924	31,903	$9,785,542	$30,506,048	$72,443,998

This exhibit denotes a vigorous growth in each of the industries, amounting to 76 per cent. in agricultural implements; nearly 50 per cent. in carriages and wagons; more than 30 per cent. in flour and grist mill products; over 90 per cent. in curried leather; and more than 100 per cent. in tanned leather; while the increase of the iron product was over 200 per cent. Add to the above the difference between the depreciated currency of 1870 and the currency on a par with specie in 1880, and it will be seen that the actual increase of manufacturing products during the decade was even much greater than the above large ratios indicate. It will be inspiring to those who are laboring to build up the manufactures of this State to note that these totals of the seven principal industries in 1880, very nearly correspond with the totals of all the industries of the State in 1870 combined. But there are other manufacturing interests in Wisconsin, almost, if not quite, as important as some of those given in the above tables. In a subsequent chapter I shall present, as fully as it is possible to do before the final revision of the Tenth Census, the statistics of all the industries of Wisconsin in 1880.

The commerce of Wisconsin has assumed, within a few years, large proportions. The great surplus of agricultural products seeks Milwaukee and Chicago as their principal outlets. The latter is now the principal grain mart of the world, with elevators capable of containing 5,000,000 bushels of grain, which were taxed, in 1880, to their utmost capacity. Wisconsin dairy products are in demand in all the great markets of the country; as are also its hops, tobacco, flour, and malt liquors. Its sawed and manufactured lumber, agricultural implements, and wheeled vehicles are sent to the almost timberless plains of the farthest West and Southwest, to the amount of hundreds of thousands of dollars every season.

With the navigable waters of the great lakes washing its entire eastern coast, and making more than half of its northern boundary, with the Mississippi and the St. Croix for its western limit, and traversed from east to west by the united waters of Green Bay and the Mississippi, Wisconsin* is well provided with water transportation, amounting to more than 1,250 miles within its own jurisdiction, bringing it into effective union with the Gulf of St. Lawrence and the Gulf of Mexico. For the year ending June 30, 1879, the number of American vessels engaged in the foreign trade entered at Milwaukee was five, of 1,585 tons; and the number of foreign vessels that entered was thirty-eight with cargoes, and twenty-two in ballast, with an aggregate of 22,423 tons. The same year there were nine American vessels, of 2,791 tons, and forty-six foreign vessels, of 16,888 tons—all with cargo—that cleared from Milwaukee for foreign ports. Of course, the coast trade was much larger. There were, in all, in the year above designated, two hundred and seventy-seven sailing vessels, eighty-three steam vessels, and one barge documented at Milwaukee; and thirty-nine steam vessels and one barge documented in the customs district of La Crosse—with an aggregate of 79,084.60 tons burthen.†

According to T. C. Purdy, special agent of the Census Bureau, the following tables exhibit the number of river and lake steamers belonging to Wisconsin in the year 1880:

* Governor Smith's Message to the legislature, Jan. 13, 1881, says: "The feasibility of making the Fox and Wisconsin rivers navigable from Lake Michigan to the Mississippi river has been confirmed. In particular, the experiments made and continued along the Wisconsin prove, that, when the waters of that river are confined within a channel not exceeding 300 feet in width, at low water, there is no difficulty whatever in maintaining ample depth of water for all purposes of navigation." Congress is at work on this improvement, to accomplish the full result desired.

† Report of Commerce and Navigation, 1879.

RIVER STEAMERS.

Class.	No.	Tonnage.	Value.	Crew.
Passenger	13	2,371.23	$88,700	218
Ferry	4	147.61	5,600	12
Tow	28	3,656.35	96,800	379
Totals	45	6,375.19	$191,100	609

LAKE STEAMERS.

Class.	No.	Tonnage.	Value.	Crew.
Passenger	20	5,992.58	$ 306,900	399
Towing	44	1,663.28	216,000	209
Freight	19	8,008.46	397,700	333
Yachts	11	218.96	17,200	44
Totals	94	15,883.28	$927,800	985

TOTAL NUMBER OF WISCONSIN STEAMERS.

Class.	No.	Tonnage.	Value.	Crew.
Steamers on Fox river*	26	881.00	$ 53,600	.....
Steamers on State waters	30	494.93	60,000	84
Total river steamers	45	6,375.19	191,100	609
Total lake steamers	94	15,883.28	927,800	985
Grand Total	195	23,564.42	$1,241,500	1,678

In the same year there were 258 sailing vessels, with 50,800.11 tons, and two barges, of 100.83 tons, documented at Milwaukee and La Crosse.

Lately, the Sturgeon Bay canal, from Green Bay to Lake Michigan, has been opened to commerce, greatly reducing the distance and dangers of navigation for vessels bound to and from the rich lumber, agricultural, and mining regions of Green Bay, and the great marts of Milwaukee and Chicago. The fact that 160 vessels, with an aggregate capacity of 32,071 tons, passed it, and that in 1880 the number of vessels using this still unfinished channel was 533, with a capacity of 113,379 tons, is an index of the wisdom of the promoters of the improvement, and the service it is destined to render the State.

Railroad construction has advanced of late years with great rapidity. From 1,010 miles in 1865, the length of lines had

* These steamers were inspected, but not enrolled or documented.

extended to 3,133.71* miles on Dec. 31, 1880, inclusive of 112 miles of narrow gauge. The increase in 1880 alone was 233.40 miles; and the number of passengers carried within the State was 2,717,500, an increase of 284,654 over the preceding year. The number of tons of freight carried on these lines was 4,347,379, an increase of 170,168 tons. The total earnings of all the roads in Wisconsin were $13,655,578.05, the increase being over $2,000,000, and the expenses were $7,583,493.47, an increase of about $550,000—making the net increase in earnings $1,620,493.50. The proportion of the stock and funded and unfunded indebtedness for the roads within the State is reported at $129,654,481.28; making the average net earnings, over and above licenses and taxes of every description, nearly five per cent. The Governor very truly observes: "There is, perhaps, no better index of the prosperous condition of the State, and the increase of the products from its soil, its mines, and its forests, than may be found in the statistics published by the railroad commissioner. They are growing more and more complete, accurate, and valuable every year. The efficiency of the management of the Wisconsin railroads, and the scrupulous fidelity and vigilance of all their employes, are attested by the fact, that, of the millions of passengers transported, not one was killed, and only two were injured; and in these cases the injuries were occasioned by their own want of care."

The statistics of the number of banks, and the banking capital and deposits, in Wisconsin in the last Census year, will be found in Chapter I., as prepared expressly for this volume by Comptroller Knox.

Great care has been taken to regulate the business of fire insurance in Wisconsin, so as to encourage foreign companies of high standing to take risks in the State, and to keep unsound companies out. State companies are organized on safe financial principles, and can not well do business, under the present statutes, unless they are properly conducted. As home capital increases, a larger per cent. of it goes into home insurance companies; a tendency which the State manifests a disposition to encourage. The following official figures show that a large margin of profits fell to the insurance companies last year:

Amount of fire risks written during the year, exclusive of amounts placed in town companies	$150,731,084
Amount paid for premiums thereon	1,569,473
Total losses paid	1,067,198

* Governor's message, Jan. 10, 1880. The *Railway Age* of Jan. 8, 1881, makes the addition during the year 233.84, and the total miles 3,121.51.

The condition of the State finances is every way gratifying. The State indebtedness amounts to no more than $1.71 per capita; and the total local indebtedness averages but $7.80 per capita. Below is a complete statement of the State and local debt of Wisconsin, together with the sinking fund and per capita debt:

Debt.	For Fiscal Year Ending	Population.	Bonded Debt.	Floating Debt.	Gross Debt.	Net Debt.	Net Debt per Capita.
Total of State	Jan. 1, 1880	$1,315,480	$8,979,808	$2,905,952	$11,851,194	$11,851,194	$9.01
State debt	Sept. 30, 1879	1,315,480	11,000	2,241,057	2,252,057	2,252,057	1.71
Local debt	Jan. 1, 1880	1,315,480	8,968,808	654,195	9,599,067	9,599,067	7.30

Here, "local debt" includes county, town, city, village, and school district indebtedness. "Town" is used in Wisconsin as synonymous with "township." The column "gross debt" exceeds the sum of "bonded debt" and "floating debt" columns by the amount of the school district debt. This arises from the fact that the school district debt could not be separated into "bonded" and "floating."

The total State taxation for the last fiscal year was $457,453; the total county taxation, $1,722,033; the taxation in cities of over 7,500 inhabitants, $1,989,647; the taxation of cities, towns, villages, etc., of less than 7,500 population, $2,705,436; making a total taxation for the State for general purposes, of $6,874,569.

To the above must be added the several sums levied for public school purposes, than which no taxes are paid by the great body of the people more cheerfully. They aggregate rather more than twenty-three per cent. of the total levy, and are as follows:

State tax	$ 181,429
County tax	273,937
City tax	294,717
Cities, towns, villages, etc., of less than 7,500 population	161,046
School district tax	1,175,772
Total	$2,086,921

making a grand total of all taxation not national, of $8,961,490.

The assessed valuation of real estate in Wisconsin is $344,788,721; the assessed value of personal property, $4,183,030; making the total assessed valuation of property, real and personal, $438,971,751. The estimated true value of real estate, according to the calculations made in the Census Office, is

$502,562,528. No estimate has as yet been made of the true value of personal property. The percentage of the assessed value to the true value of farming lands of Wisconsin is seventy-one per cent. for the State at large, and seventy-three per cent. for the seventeen most densely populated counties. The percentage of the assessed value to the true value of town lots for the State at large, is seventy-four per cent., and for the seventeen most densely populated counties precisely the same. It is evident, after a careful examination of all the schedules, that a recent decision of the Supreme Court has had not a little to do with increasing the assessment values of the State. The Court decided, that, unless the basis of the assessment was the true value of the property, the tax levied on the assessment could not be collected. In some counties, this decision had the immediate effect of raising the assessment; and, as a result, the real property in the State of Wisconsin is, perhaps, assessed as fairly and honestly as that of any State in the Union.

The total county debt of the State, for which bonds have been issued, aggregates $2,080,169; floating debt, $212,085. The total indebtedness, bonded and floating, of the cities of a population of 7,500 and upwards, amounts to $3,690,386. The following is a table of the Wisconsin cities of over 7,500 inhabitants, and their total bonded indebtedness:

Appleton	$ 100,000	Milwaukee	$2,350,289
Eau Claire	101,000	Oshkosh	145,500
Fond du Lac	165,000	Racine	226,011
Green Bay	143,950	Watertown	229,400
Janesville	94,000		
La Crosse	135,000	Total	$3,663,650
Madison	158,500		

The debt was incurred for the following purposes: Bridges, $69,950; fire department, $14,000; river improvement, $96,000; railroad aid, $793,900; refunding old debt, $1,022,800; schools, $62,000; streets, $25,000; water-works, $1,600,000; total, $3,683,650. Of this amount, $174,511 draws ten per cent. interest; $378,900, eight per cent.; $2,737,950, seven per cent; $90,000, six per cent; and $302,289, five per cent.

I next present a comparison of the increase of population of the cities of 7,500 inhabitants and over, during the last three decades, the assessed and estimated true value of real estate and personal property in 1880, also the total tax and the bonded and floating debt the same year:

Cities.	Popul'n 1880.	Popul'n 1870.	Popul'n 1860.	Total Assess'd Value of Real Estate and Personal Property.	Estimated True Value of Real Estate and Personal Property.	Total Estimated True Value of Real Estate and Person'l Property.	Taxation. Total Levy	Total Debt.
Appleton	2,339	4,518	3,005	$ 2,078,120	$ 2,951,277	$ 5,342,888	$ 39,750	$ 100,545
Eau Claire	.....	2,236	10,118	2,541,638	2,488,505	3,391,340	69,541	101,000
Fond du Lac	8,450	12,764	12,091	5,417,175	2,265,342	4,260,456	119,002	165,000
Green Bay	2,275	4,666	7,785	1,805,718	1,207,212	1,608,616	64,929	147,140
Janesville	7,702	8,789	9,018	4,011,870	3,427,088	4,569,277	56,011	24,000
La Crosse	8,960	7,785	14,505	3,126,000	4,230,000	5,695,656	100,082	135,000
Madison	6,611	9,176	10,325	4,060,994	2,264,247	4,252,229	91,905	188,500
Milwaukee	45,246	71,440	115,578	55,875,969	46,995,722	65,227,542	1,185,616	2,250,289
Oshkosh	6,086	12,663	15,749	4,444,000	3,727,500	4,970,000	100,661	148,500
Racine	7,822	9,980	16,031	7,682,669	7,161,706	9,548,941	101,255	280,012
Watertown*	5,302	5,264	7,223	1,551,330	2,749,633	3,666,177	36,045	220,400
Totals	93,606	149,338	237,926	$91,596,765	$84,426,847	$112,565,199	$1,069,647	$3,690,386

The intellectual, moral, and religious condition of this rich and enterprising commonwealth, is expressed in terms unmistakably creditable to all concerned, by the independent and high moral tone of its secular and religious press, and the statistics of its educational and social institutions. There are 319 newspapers in the State, of which twenty-one are daily, two tri-weekly, four semi-weekly, 226 weekly, three bi-weekly, eight semi-weekly, and seventeen monthly. According to the Census Bureau, the twenty-one dailies circulate 17,708,336 copies per annum. In publishing the resources of the State, and advocating wise State and National legislation, several of these papers have conferred inestimable benefits upon the commonwealth.

Considering that, under the law, all postoffices, the receipts of which entitle the postmaster to $1,000, and over, are called presidential postoffices, it is worthy of note, that, while Tennessee, which was settled more than a century ago, and has now a population of 1,542,463, has but seventeen presidential postoffices, Wisconsin has, in little more than forty years, nearly overtaken her in population, and has sixty-two presidential postoffices, bearing witness to the vigorous intelligence and enterprise of her people.

According to the report of State Superintendent W. C. Whitford, the total amount expended for common schools during 1880, was $2,166,368.43, an increase of nearly $14,000 over the preceding year. By the terms of the "compulsory education law," which went into effect Sept. 1, 1879, all children between the ages of seven and fifteen years, not excused therefrom for good reason, are required to attend a public or private

* Watertown in 1870, exclusive of part, and in 1860 of the whole, of the city of Watertown. (See Ninth Census, U. S., p. 290, for 1870.)

school at least twelve weeks in each school year. The number of children between these ages, in this State, is found to be 229,076; and 170,402—that is, nearly three-fourths of these—attended the public schools during the year. Of the total school population, numbering 483,198, there were 299,258 in attendance upon the public schools, an increase of nearly 6,000 over the enrollment of 1879. The condition of the several educational trust funds at the close of the fiscal year was as follows:

Educational Funds.	At Interest.	On Hand.
School fund	$2,716,296.91	$81,581.70
University fund	207,376.40	19,065.38
Agricultural college fund	244,519.53	22,811.34
Normal school fund	1,089,543.60	31,181.51
Totals	$4,207,699.44	$104,609.93

The increase during the year in the amount of interest received on account of the school funds, was $50,662.79. Wisconsin leads the West in provisions for normal instruction. Nearest to it in this regard, is the neighboring State of Minnesota, with three good normal schools. Wisconsin has four, in charge of a Board of Normal Regents; Illinois has but two; Michigan, Indiana, Iowa, Nebraska, and Kansas, but one each; while Ohio can scarcely be said to have any—certainly it has no normal school system. Wisconsin has, also, one of the most thoroughly organized systems of teachers' institutes. These itinerant normal schools, each in charge of a professor of one or another of the State normals, carry the elementary principles of normal instruction to every county in the State; and there is not a rural school teacher, in the obscurest corner of the country, who is fairly excusable for ignorance of these improved methods. The State University of Wisconsin has attained high standing among the higher institutions of learning in the United States. Including preparatory students, it had in 1880 an attendance of 436. The Washburn Observatory, connected with the State University, is one of the best equipped astronomical institutions in the United States. There are at least thirteen universities, colleges, and academies under denominational control; several of which—as Beloit College, Lawrence University, Ripon, and Racine colleges—are well provided with laboratories, apparatus, libraries, and museums, and are justly entitled to the excellent

reputation they have acquired as institutions of recognized high rank. The charitable and penal institutions of Wisconsin are among the best in the United States, and have borne excellent fruit. This is particularly true of the Reform School for Boys, at Waukesha, and the Industrial School for Girls, in Milwaukee. The workshops of the former are more than self supporting, and the education of the boys is well attended to. The fact that the State prison of a government covering nearly one and a half million inhabitants, contained, Sept. 30, 1880, only 277 convicts—thirty-two fewer than the year before, and sixty-nine fewer than in 1878—and the further fact, that pauperism is uncommonly limited, certainly speak well for the industrious and law-abiding character of the population, and the wise administration of their government.

In Wisconsin, churches are almost, if not quite, as numerous as public school houses, all the leading religious denominations of the United States being well represented. Public libraries are found in all the large towns, and school libraries in many of the villages. The State Library and the State Historical Society and Museum at Madison are noble institutions, constantly growing in usefulness. Associations for the encouragement of science and art have been established in Milwaukee and other prominent places.

Thus, very briefly, considering the importance of this State, I have endeavored to set forth its natural resources, the rapid development which has been given to these resources since the settlement of the country fairly commenced, less than fifty years ago, and those highest fruits of good government, the happy intellectual and moral condition of the people. What has been accomplished commands admiration; and yet a moment's reflection assures us that it is but the beginning of what is to be when the entire State shall be settled. At this time, over half the entire population of Wisconsin is within seventeen of its sixty-two counties. These seventeen wealthy counties are clustered along the shores of Lake Michigan. Milwaukee, with its 100,000 inhabitants; Janesville, with the fine water-power of the Rock river; Fond du Lac, with its 16,000 inhabitants; Oshkosh, with its vast lumber interests; Racine, with its 18,000 inhabitants and its agricultural implement manufactories; and the thriving cities of Watertown, Green Bay, and Sheboygan —are all within this fraction of the State. These seventeen

counties produce nearly half the corn and wheat. They contain about fifty-seven per cent. of the total taxable property of the State. One-half the sales of farming lands in 1879 were in these counties. The aggregate selling price of all these pieces of property was $6,206,360, against the assessed value of the same property, $4,569,894. Nine out of the eleven cities of over 7,500 inhabitants are in these same counties. The total sales of city and village lots in 1879, amounted to $4,490,327—of which the assessed value was $3,327,267. Of the whole amount, $3,097,948 changed hands in the seventeen counties referred to.

Ready transportation, nearness to market, and other causes, have had more to do with this one-sided development of Wisconsin than any special advantages of soil or climate. There are tens of thousands of acres of rich farming lands in the State that will be occupied as railroads penetrate to them, and home markets grow up, with the increase of mining and manufacturing. The extreme north can never equal the southern counties of Wisconsin for agricultural purposes; but full compensation for this difference may be found in the mines, the forests, and the fisheries; so that there is every reason to believe, that, as this State added more than 285,000 to its population, and a much larger per cent. of increase to its wealth, during the decade just completed, it will continue to grow in wealth and population quite as rapidly during the years to come. Indeed, the latest official reports fully sustain these bright anticipations. The annual report of the General Land Office shows that 146,951 acres were disposed of in Wisconsin in 1879: the annual report of the Secretary of State, for 1880, shows that about 21,000 immigrants settled in Wisconsin in that year, adding, as is believed, at least $1,500,000 to its working capital.* The State sold 82,000 acres of land, patented 64,000 acres to counties for public purposes, and holds now 1,455,202, all open to purchase, except 82,000 acres. The sales of real estate, for the year ending Aug. 31, 1880, aggregated 1,172,800 acres of farm and wood lands, at an average of $7.59 per acre—making a total of $14,390,859; besides 12,283 city and village lots, selling for $5,105,588, an average of $415.66 per lot. There is but one interpretation of these statistics: they show that Wisconsin has entered upon a new era of prosperity.

* Estimate of Governor and Secretary; see official documents.

CHAPTER IX.

STATE OF MINNESOTA.

MINNESOTA, with an area of 83,365 square miles, or 53,353,600 acres,* lying between the parallels of 43° 30′ and 49° north latitude, and between the meridians of 89° 39′ and 97° 5′, longitude west from Greenwich, embraces the sources of three of the grandest river systems of the globe.† Lying midway between the arctic circle and the tropic of cancer, and midway between the Atlantic and Pacific Oceans, it occupies a considerable portion of the central plateau of that immense interior basin, between the Appalachians on the east and the Rocky Mountains on the west, which stretches all the way from the Gulf of Mexico to the Arctic Ocean. Here the Mississippi takes its rise, within sight of springs that flow into the Great Lakes and issue at the Gulf of St. Lawrence; while farther west in the same State, the low divide between Lakes Big Stone and Traverse, sheds the falling rain, on this side, into the sunny Gulf of Mexico, and on that, into the upper urns of Hudson's Bay. The highest elevation of the State is reached between the 47th and 48th parallels of north latitude, and extends westward from the western extremity of the granite uplift about Lake Superior nearly three-fourths the width of the State. Here it divides —one branch trending northwesterly, separating the waters of the Rainy Lake river system from the tributaries of the Red River of the North; while the other takes a southwesterly direction, dividing the affluents of the Red River from those of the Minnesota and Mississippi rivers, and crossing the western State line between Traverse and Big Stone Lakes. Diverging from the latter branch is another dividing elevation, which, turning to the southeast, in Douglas county, forms the

* According to the Tenth Census. The Annual Report of the Commissioners of the General Land Office says, 83,531 square miles, or 53,459,840 acres.

† A moiety of Minnesota, mostly water, projects north of the parallel of 49°—the national boundary being, by treaty, the Rainy (Lake) river, and a line through Lake of the Woods to the "Old Government Depot," thence a line due south to the 49th parallel, which is followed west to the Pacific.

partition between the streams that flow, on the one side, into the Mississippi, and, on the other side, into the Minnesota river. On the south side of the Minnesota river, crossing the southwest corner of the State in a southeasterly direction, is the dividing ridge between the Minnesota and Des Moines rivers; and in the southeastern part of the State is a like formation separating the tributaries of the Mississippi from those which flow into the Lower Minnesota river from the south; while Morrison, Crow Wing, Mille Lacs, and Aitkin counties, in the center of the eastern half, form the plateau between the Mississippi and St. Croix systems. From the foregoing, it will readily appear that the surface of the State is diversified by a succession of irregular highlands and valleys, intersecting it in every direction. These elevations lie at an altitude of from one thousand to eighteen hundred feet above the sea level. In certain localities, the surface, though by no means mountainous, has many of the characteristics of such regions. While there are multitudes of lakes scattered over this territory, there is very little swamp land. Even the cranberry, wild rice, and hemlock marshes in the northeastern part of the State may be drained at a small expense, and when so treated are found to be of equal value to other parts of the State. The southern and southwestern portions are what may be properly called undulating and diversified prairie land; while in the west and northwest the prairies are very level. The least attractive portion of the State is the summit of the divide between the waters that empty into Rainy Lake river on the north, and those which run south into Lake Superior and the Mississippi river. These are the most extensive of the highlands of the State, and are between four and five hundred feet above the general level of the country. After leaving the granite formation in the vicinity of Lake Superior, the country westward is made up of vast deposits of drift and sand, cut into an extremely uneven surface by numerous watercourses in every direction. In some parts this region is a constant succession of hills, knolls, lakes, swamps, and streams, for several miles; then will follow a level plain of considerable extent, terminating in a valley with a quiet stream running through it; after leaving which, one comes again to hilly ground. Usually the sides of these hills are steep, and almost barren of vegetation; but the soil in the valleys is always exceedingly fertile, and generally covered with dense forests. Passing the

summit of this elevation, west of St. Louis county, the descent into Rainy Lake valley is much more gradual than on the south side. The surface here is gently undulating, and covered with a rich soil. The eastern portion of this Rainy Lake valley bears a fruitful growth of timber, checkered with occasional small prairies. These are more frequently met with as one proceeds westward, until the nearly treeless plains of the Red River country are reached.

Since Minnesota juts even beyond the 49th parallel of north latitude, and extends thence southward more than 400 miles, or nearly six degrees, it is not strange that the climate, so deliciously cool in summer, is rigorously cold in winter. According to the Smithsonian chart, the mean temperature of all that portion of the State below the 47th degree of latitude, excepting the east half of the counties along the Iowa line, is 40° Fahr. This is also the summer mean of the Red River valley as far north as Pembina. Between the areas here described, for the rest of the State, extending to Rainy river, it is represented as 36°. The average temperature of the hottest week in 1872 ranged from 85° Fahr. in the southwestern corner of the State, to 80° near Duluth; and the average temperature of the coldest week of 1872–73 ranged from 10° below zero in the southeastern counties, to 20° below in the northwest, near the sources of the Minnesota and Red rivers. According to the same authority, the average annual rainfall ranges from twenty-eight inches at the last-named point to as high as forty inches on the southeastern border, down to twenty-four inches at the head of the Mississippi, and rather below twenty inches near Pembina. Owing to the dryness here indicated, the severe cold of Minnesota winters is not so keenly felt as it would be in a more humid atmosphere; and in still, bright days (of which there is a large proportion), the temperature, even at twenty degrees below zero, is not hard to bear. Out-door laborers testify that they lose fewer days from the inclemencies of the weather here than in localities several degrees further south, where the air is not so dry and the weather is more capricious. But high winds and low temperature in conjunction produce intense suffering, and drive every living creature to shelter. Fortunately, such days are comparatively few. There can be no doubt of the healthfulness of this climate: it is well established by vital statistics. The medical profession throughout the United States has

recognized this fact; and annually great numbers of invalids suffering from phthisic and pulmonary diseases are sent here for relief.

As to the effects of this climate on agriculture and horticulture, there is now little left to conjecture. The climate and the soil have been thoroughly tested within all the parallels from the Iowa line to Pembina; and the results are now matters of official record, which I shall present farther on.

Nearly half of Minnesota is covered with forests, more or less dense. The elevated and broken region north of the 46th parallel and east of Red Lake, including an area of 21,000 square miles, embraces immense forests of pine and other coniferæ; the prevailing wood being pine, intermingled with a considerable proportion of birch, aspen, hard and soft maples, ash and elm, with a heavy skirting of oak and other hardwood timber on the west and southwest. Along the St. Louis and other rivers flowing into Lake Superior, hemlock, cedar, spruce, and fir abound. The principal lumbering regions, at present, are about the headwaters of the St. Louis river, the Upper St. Croix, and the headwaters of Kettle, Snake, Rum, Crow Wing, and the Upper Mississippi. The belt of timber known as the Big Woods, forms a deep fringe of from ten to twenty miles in width, along the western slope of the Mississippi, from the Crow Wing valley to the Sauk at St. Cloud. Crossing into the valley of the Crow river, and keeping a general southeasterly course, it occupies a large strip of country between the Mississippi and Minnesota rivers, nearly one hundred miles on its longest side, with an average breadth of forty miles. Its main body crosses the Minnesota river between Belle Plaine and Le Sueur, sending off a spur to the southwest into Blue Earth county, and another to the southeast, occupying about one-half of Rice and Scott counties. The Big Woods cover fully 5,000 square miles, of which 4,000 is north and 1,000 south of the Minnesota. Besides the Big Woods, there are no large forests in Minnesota west of the Mississippi. "Nearly all the streams have narrow fringes of woodlands, and some of the valleys are dense masses of timber. The wide bottoms of the Minnesota and Mississippi have a deep border of thick and massive woods, in which the large cotton-wood and maple are conspicuous, with white and black walnut, butternut, linden, boxwood, and hickory." Near the centre of the State, and between the Big Woods and the prairie districts,

lies the famous Park region. This section of the State is a vast, undulating prairie, checkered with small groves of oak and other timber, with every here and there a beautiful, sky-tinted lake of almost perfect transparency. In the almost treeless region of the west and southwest, experience has shown the farmer that trees can be planted at small expense, and that they grow very rapidly upon the prairies. Ten acres of timber, if properly cared for, will, in five years' time, supply fuel and fencing for a farm of 160 acres. The most worthless lands of the State, planted in trees, would in twenty years become worth $100 an acre. It is less trouble to take care of a ten-acre field of young forest trees than to cultivate an equal area planted in corn. The government provision giving all citizens of proper age a quarter-section of land upon the condition that they shall put ten acres of it into timber, is a very wise and judicious one; but the concurrent testimony of intelligent observers goes to show that the law is very poorly complied with. Many of the settlers regard it only as the purchase price of the land—payment to be avoided in every case, if possible. They take the wrong view of it; for there is no crop of an equal number of acres, not even wheat, which will, in the long run, prove so profitable as a ten-acre field of good timber. From official figures we learn that 28,000 acres of forest trees were growing in 1879, and that 3,222 acres were planted during the same season. There are 1,000 miles of trees planted along highways and around farms in the State. East of Itasca county, the country becomes more rugged, and is almost mountainous. The famous Park region of Minnesota is on the summit of that branch of the great divide which turns southwest after passing Leech Lake. It possesses the same features as the eastern portion, but reduced to a smaller scale. The hills are not nearly so elevated or steep, nor are their slopes barren of vegetation. The low plains are larger, the valleys less deep, the lakes smaller and more frequent, and the streams of gentler flow; the swamps being wholly omitted from the picture. Instead of the dense forests met with on the higher eastern plateaux, here are only groves and oak openings, with frequent intervals of prairie; and this diminution of the rugged aspects of the landscape continues as one proceeds towards the west, until open prairie is finally reached in the treeless regions of the Red River country. Nearly the same description applies to the divide between the

Minnesota and Upper Mississippi rivers, except that the hills are yet smaller and less frequent, and a larger portion of the surface is occupied by prairie lands, until the Big Woods are reached near the western line of Wright county.

Excepting the granite formations in the vicinity of Lake Superior, Minnesota is covered with deposits of drift and alluvium, of various depths and widely different elements. Over considerable districts, the inferior, or earlier, of these deposits, are almost uniformly argillaceous, or calcareo-argillaceous; and, in some parts—as, for example, Blue Earth, Brown, Goodhue, and perhaps other counties—the lower layer of this deposit contains an exceedingly large percentage of alumina. Lying upon this, and more or less intermingled with it, is a mixture of calcareous and siliceous matter. Throughout the State, these deposits are filled with vegetable and animal fossils, covered, in the wooded regions, with a thick surface layer of vegetable mould, mixed with various silicates. On the prairies, instead of the mould, the vegetable remains are compounded with washings of clay, sand, and ashes of plants, giving them something of the character of weak alkaloids. In the almost level region along the Red River, where the water-flow is necessarily very gradual, the alkaloid quality of the land is more plainly marked; while on the prairies bordering on the Big Woods and the granitic formation extending west and south of Lake Superior, and in the Rainy Lake river region, the lacustrine deposits have somewhat the character of the loess of the Rhine valley, Germany. Everywhere, the combinations of organic remains with the varied bases of the soil, give it an abundant supply of phosphates and other fertilizing properties. In appearance, Minnesota soil is of dark to grayish brown color, being darkest in the lowest plains and valleys, where it is nearly black. It is everywhere exceedingly friable, seldom, if ever, caking under any circumstances, and so easily cultivated that a hoe is scarcely needed in the corn fields and gardens, if plowing is attended to in proper time. It may be said to be a rich, warm loam, from two feet in thickness in the southern part of the State to five in the Red River country. David Dale Owen described it as "excellent in quality, rich as well in organic matter as in those mineral salts which give rapidity to the growth of plants, while it has that durability which enables it to sustain a long succession of crops."

The water features of Minnesota are among its most striking and valuable attractions. Besides its three great river systems, already spoken of, connecting it with the great seas of the North, the East, and the South, there are fifty smaller rivers, and almost numberless creeks, affording numerous mill privileges, while they water, drain, and beautify the country. There are 7,000 lakes in the State, varying in size from 300 yards to fifteen miles in diameter. Their average extent is about 300 acres; but a number of them exceed 10,000 acres, and two or three are about 100,000 acres each in extent. It is estimated that there are 2,700,000 acres in Minnesota covered by the lakes and rivers, without including that part of Lake Superior which lies within its limits. Ordinarily, the shores of the lakes are dry and firm down to the water's edge, except at their outlets. They are very picturesque; with clear, cool, transparent waters; with sandy or pebbly bottoms, and generally with wooded shores; and are far famed as resorts for the invalid, the tourist, and the sportsman. These lakes and rivers abound in fish of superior flavor and quality, including trout, black and rock bass, pike, pickerel, perch, sun-fish, and cat-fish. The prairies and forests are filled with game of great variety. Among the larger animals may be found bears, wolves, deer; and occasionally the elk, the fox, and the lynx. Otter, beaver, mink, muskrat, prairie chicken, partridge, pigeon, snipe, plover, and grouse are quite common; while in the rivers and lakes may be found plenty of wild geese, brant, ducks, and swans. The number and variety of small birds are very great, some of them being of beautiful plumage. Among the birds of prey are found the hawk, the owl, and the eagle.

Good building stone is found in many parts of the State. There are about one hundred quarries opened, including several near Lake Superior, which produce excellent building material. Numerous lime-kilns exist. The mining interests of Minnesota are as yet inconsiderable. No coal has been found within its limits, and its geology holds out no promise of any in the future. There is good hope that iron and copper will be found in paying quantities in the Lake Superior country; but, as yet, there is little to be said with certainty on this subject. Silver exists on the Minnesota shore, opposite Silver Islet, and in the copper-bearing series of rocks a little farther south; and small quantities of gold have been found near Vermillion Lake.

It is now just two centuries since Louis Hennepin, a Recollet monk, who has already been mentioned as one of the companions of La Salle, ascended, in 1680, the Mississippi river, to the Falls of St. Anthony, which he named from his patron saint. Subsequently La Honton and Le Sueur made some explorations in this region, and vain efforts were put forth to plant the cross among the tribes that roamed here and stoutly maintained their jurisdiction against all new comers. In time, the fur traders drew large quantities of furs and peltries from these fierce and independent tribes, but they received little or no encouragement to settle among them. Nearly a century passed before that famous explorer, Captain John Carver, visited the Upper Mississippi country and gave the world another glimpse of this wild, romantic region. Soon after the Anglo French treaty of 1763, by which all Minnesota east of the Mississippi river passed, at least on parchment, from France to Great Britain, this eccentric and adventurous officer set forth to explore the new acquisitions of his sovereign. With a keener prescience than most men of his time, he foresaw and foretold the immense value of these Western accessions to the British territories in America. Having traversed Wisconsin, he spent the winter of 1766–67 with the Indians near the site of New Ulm, on the Minnesota river, about fifty miles above St. Peter's. He found the country wholly in the actual possession of the savages. Only twenty years from the time of the French cession of this region to Great Britain, the latter power ceded it to the United States; but it did not deliver it over to American domination until 1796. Still, the aborigines looked upon the entire section of the country as their own, and held it against all intruders. In 1805, the United States extinguished the Indian title, by purchase, to a tract of land at the junction of the Minnesota river with the Mississippi, extending up the latter stream to a short distance above the Falls of St. Anthony. Fifteen years later, Fort Snelling was constructed, in the forks of the two rivers. It is asserted that the first flouring mill of Minnesota was erected at the Falls of St. Anthony in 1822, under supervision of the officers of Fort Snelling, for a source of supply to the garrison. A little later, a company of Swiss farmers, disgusted with the ill-management and natural discouragements of the Selkirk settlement, in the British Possessions, settled near St. Paul, and initiated in earnest the agricultural history of Minnesota, which has of late

years developed with such remarkable vigor. Anglo-American settlements were commenced at several points along the east side of the Mississippi, between 1836 and 1838, in anticipation of the early extinguishment of the Indian title, which was not effected until the latter year. A settlement was begun at Stillwater, on the St. Croix, in 1843. On March 3, 1849, Congress passed a bill to organize the Territory of Minnesota. Alexander Ramsey, of Pennsylvania, proclaimed the Territory duly organized on the first day of the following June. At that time St. Paul and Stillwater numbered only a few hundred inhabitants, and besides these places there was scarcely any settlement deserving the name of a town or village. The total population of the new Territory was little more than 4,000. All the country west of the Mississippi, and a large part of that on the east side, were still claimed by the aborigines. An Indian treaty entered into in 1851, opened a broad region west of the Mississippi to immigration; and the settlement of this portion of Minnesota proceeded at a very rapid rate. Indeed, this progress was so rapid that the Indians became alarmed at the prospect of being crowded out of the State altogether. Not without cause, they grew suspicious and restless. In time, maddened by frequent acts of trespass, and bad whisky, a few of the least governable members of the tribes became refractory, and committed counter-depredations. Finally, they became utterly reckless, and perpetrated a series of terrible massacres, which led to the utter expulsion of all the Sioux and the Winnebagoes to reservations given them beyond the State. Only a few harmless Chippewas remain on reservations in certain parts of Minnesota.

Between 1850 and 1860 the increase of population and wealth was very striking, being over 273 per cent. With no transportation but that of boats, stages, and emigrant wagons, immigration entered this new domain at such a rate that Congress was very soon easily induced to pass an enabling act, providing for the admission of Minnesota to the Union. A State constitution was formed in the summer of 1857; and the new State was duly admitted May 11, 1858. This event added a new spur to immigration; and, the financial revulsion of 1857 having turned the attention of a large portion of the struggling masses of all parts of the country to agriculture, the foster mother of the race, the development of this industry was, indeed, surprising. Whereas in 1854, the cultivated area of Minnesota was estimated at only

15,000 acres, in 1860 the Census reported it at 433,267 acres.

The population at the several decennial periods beginning in 1850, is given in the accompanying table:

Census Years.	Totals.	White.	Colored.	Foreign Born.	Ratio of Increase.
1850	6,077*	6,038	39	1,977	.....
1860	172,023*	169,393	2,628	58,728	273
1870	446,058†	438,257	7,799	160,697	78
1880	780,807	776,940	3,866	267,699	75

The leading industries of Minnesota are agriculture, and the manufacture of flour and lumber.

Though the records of farms and total acreage, especially the former, have not been kept with thorough accuracy, a glance over the comparative tables of acres under cultivation from 1870 to 1879 reveals wonderful progress. In 1870, the total acreage in crops was 1,725,111. In 1879, the cultivated area had increased to 4,090,034 acres—a gain of 2,364,928 acres, or 146 per cent., in nine years. From 1878 to 1879 an increase of 660,875 acres is shown. The cultivated acreage of 1879 is embraced in 68,065 farms, averaging about sixty acres of cultivated land to each farm. A letter from the United States Surveyor-general, under the date of Jan. 22, 1880, says that the grand total of acres surveyed in the State down to January, 1880, was "40,275,411, leaving an estimated amount of 10,472,429 acres yet to be surveyed."

From this, it appears that only about one-ninth of the surveyed area of the State has been brought under cultivation, although much the larger proportion of it is believed to be susceptible of profitable tillage. Besides this, there are, as above stated, upwards of 10,000,000 acres yet in the unsurveyed regions, fully one-half of which, it is thought, will prove to be excellent farming land

Wheat is the prominent agricultural product of Minnesota. Whereas the corn yield of Illinois and Iowa is from five to six fold the amount of their wheat yield, in Minnesota the wheat greatly outmeasures the corn, amounting to more than double as many bushels in 1880. The same year, the oats, as usual in this State, outmeasured the corn, reaching, according to the Census, 23,372,752 bushels. But, whereas the wheat yield here

* Omitting Indians. † Including 15,570 Indians in tribal relations.

given shows an increase of but 81 per cent. since 1870, the corn yield shows an advance of 513 per cent.

The following table shows the total annual yield, and the yield per acre, of the nine principal crops of Minnesota, averaged for five years; also, the price per bushel, pound, or ton, the total value, and the value of the yield per acre, of each crop, averaged for the same period:

Crops.	Total yield of crops of 1879 in bush'ls, pounds or tons.	Average annual yield in bushels, pounds, or tons for 5 yrs., ending 1879.	Avg. price per bushel, pound or ton for 5 years.	Average annual value of crops for 5 years ending with 1879.	Av'ge ann'l yield p'r acre fr 5 yrs. ending 1879.	Avg. ann'l value per acre for 5 yrs. ending 1879.
Indian corn	5,750,000	12,152,350	$ .35	$ 4,054,570	31.3bu.	$10.78+
Wheat	19,600,000	27,446,973	.82	22,158,164	13.6 "	11.35
Rye	56,000	155,160	.52+	80,119	19.0 "	9.88
Oats	12,500,000	15,445,600	.29+	4,356,338	34.1 "	9.72
Barley	830,000	1,904,180	.58	950,846	26.6 "	14.18
Buckwheat	35,000	85,600	.63+	52,779	15.4 "	9.81
Potatoes	3,000,000	3,765,600	.32+	1,356,263	106.0 "	33.91
Hay	522,000	1,241,364	4.99	6,133,519	1.44 T	7.19
Total				39,141,588		

The buckwheat produced in 1879 amounted to 126,000 bushels; the rye, to 176,000 bushels; the potatoes, to 10,822,800 bushels; the hay, to 2,456,000 tons. The total value of the principal cereals of Minnesota was about $39,418,132; and the value of the hay and potatoes, $8,893,626. I next give the principal cereal crops of this State, in 1879, as stated, in bushels, by the Census Bureau, compared with the Census returns of 1860 and 1870:

Crops.	1860.	1870.	1880.
Wheat	2,186,996	18,866,073	34,601,080
Rye	121,411	78,088	215,245
Oats	2,176,602	10,678,261	23,383,158
Indian corn	2,941,953	4,743,117	14,881,741
Buckwheat	28,052	52,488	41,756
Barley	109,668	1,032,034	2,972,965
Totals	7,564,078	35,450,001	76,044,895

In 1879, there were 258,746 apple trees in bearing, besides 1,165,485 growing trees; there were 71,543 grape vines, producing 126,763 pounds—a gain of more than 100 per cent. in five years. There were, also, 63,427 growing vines. The strawberry crop

amounted to 237,269 quarts. Here, as in most other States, there are no adequate statistics of the full products of the small fruits, or the yield of the market gardens.

The principal farm animals of this State in 1879 were: horses, 274,500; mules, 7,300; milch cows, 304,000; oxen, 322,400; sheep, 307,500; hogs, 174,200—an aggregate of 1,389,900 head, valued at $31,813,608. The following table shows the number of farm animals in Minnesota, averaged for five years; also the price per head, and the annual total value averaged for the same period according to the estimate of the Agricultural Bureau:

Farm Animals.	Number in February, 1870.	Annual number of animals averaged for 5 years ending January, 1880.	Price per head avg. for 5 yrs. ending Jan., 1880.	Total annual value averaged for 5 years.
Horses	102,500	243,840	$67.15	$16,331,619
Mules	2,500	5,920	86.06	499,273
Oxen and other cattle	204,400	315,460	18.39	5,845,167
Milch cows	135,000	263,200	21.46	5,605,765
Sheep	125,300	268,880	2.36	580,348
Hogs	131,300	199,360	5.39	1,085,536
Totals	.....	1,297,160	.....	$30,937,634

The dairy interests of Minnesota are developing with great rapidity, as is very manifest from the following official table;

Years.	Number of Cows.	Pounds of Butter.	Pounds of Cheese.
1871	106,616	7,356,763	428,147
1872	125,691	8,832,630	775,680
1873	155,454	10,140,316	1,031,510
1874	169,616	10,916,942	1,090,266
1875	176,278	12,039,371	1,009,969
1876	185,149	12,348,971	1,063,242
1877	200,379	13,443,195	839,075
1878	223,443	14,873,740	1,008,531

Faribault leads all other counties in its cheese product, which amounted, in 1879, to 525,257 pounds; Olmstead, Steele, and Stearns following with 97,000, 90,000, and 78,000, respectively. The leading butter-producing counties are: Fillmore, 650,000 pounds; and Goodhue, Blue Earth, Olmstead, and Freeborn, producing from 610,000 to 532,000 pounds each.

The prairies of Southern and Southwestern Minnesota produce a heavy growth of nutritious native grass, which rendered this region, until a few years since, a favorite pasture ground of the

buffalo. It is, perhaps, too much to say, with some of the settlers, that this grass is superior to the tame varieties of the East; but it is unquestionably one of the very best of American wild grasses. If butter and cheese making is profitable in New York State, where land is worth from $50 to $100 an acre, it must certainly prove so in this State, where pasturage is still almost free.

The pure, dry, and invigorating air of Minnesota makes it an excellent sheep raising region. Owing to the comparative absence of mud, foot-rot, so injurious to sheep husbandry in many other States, is almost unknown. This interest is growing in Southern Minnesota, and is everywhere attended with a good degree of success. Last year there were 194,576 sheep sheared in the State, yielding 770,482 pounds of wool. In 1878, there were only 186,456 sheep; but they sheared 790,203 pounds of wool. The leading sheep raising counties at present, and the number of animals in each are: Faribault, 10,980; Martin, 9,664; Wright, 8,495; Le Sueur, 8,410; Hennepin, 8,048; Carver, 6,832; Goodhue, 6,372; Stearns, 6,085; Kandiyohi, 6,084; Blue Earth, 6,042; Sibley, 5,061.*

Bee farming is common all over the State, both among farmers and villagers. In 1878, there were 15,105 hives reported, which yielded 253,221 pounds of honey. Italian bees are common, and thrive as well as the native varieties. The long winters force these busy workers to lay up large stores of honey. By one of the compensations of nature, the honey-bearing flowers are abundant, and the dry climate is favorable to the health of the hives.

The State statistics show, that, in 1879, amber cane was grown with greater or less success in Winona, Wright, Washington, Watonwan, Wabasha, Steele, Sibley, Rice, Olmstead, Redwood, Nicollet, Mower, Mille Lacs, Meeker, Le Sueur, Hennepin, Goodhue, Freeborn, Carver, and Blue Earth counties. Where care, directed by experience, was used in cultivating and gathering the cane, and good machinery was employed to press it, the average yield was from 100 to 190 gallons of syrup to the acre. In other counties having the same soil and climate, but where this industry was not rightly conducted, the average was from 38½ to 60 gallons per acre. The business is yet somewhat experimental. The area cultivated for cane, in 1877, was

* State statistics.

3,200 acres; in 1878, 3,207 acres; in 1879, 4,727 acres. As it costs but little more to grow the cane than an equal amount of corn, while even at a low yield it is much more profitable, and as a number of costly mills have lately been built for the manufacture of syrup, this industry seems destined to increase rapidly.

In the year 1879, 1,528,246 acres of new land were disposed of; and the total new land taken last year probably exceeded 2,500,000 acres. By far the greater proportion of this was in the Red River valley. During the month of June of this last year, 215,912 acres were taken at the government land offices, or bought of the railroads. The most remarkable sales of land for the year were along the St. Paul, Minneapolis & Manitoba railway. During the first six months of the year, 983,973 acres were disposed of. In the wheat-growing counties lying along the line of the Northern Pacific—Crow Wing, Morrison, Todd, Wadena, Otter Tail, Becker, and Clay—we find a cultivated area of 210,160 acres; wheat area, 155,282 acres; breaking, 73,049 acres. Total number of entries at land offices of Duluth, St. Cloud, Fergus Falls, and Crookston, for twelve months ending June 30, 1880, 6,793—872,145 acres; within limits of land grant, 3,207 entries—404,729 acres; railroad lands sold during the same time, 14,463 acres. To those who wish to come and settle on the prairies of Minnesota, we would say that if they take government claims they can get along without difficulty if they have $500 to start with. Land office fees are $14; materials for a house of single boards, which can be made warm and comfortable in winter by sodding outside, $35; stove, furniture, and crockery, $50; oxen, breaking and backsetting plows, and wagon, $225. This will leave a man $175 to live on—besides all the wages for his winter's work. The second year his land is improved and he is so far established that he can procure all necessary implements or articles in anticipation of his wheat crop. The fifty acres which he will seed will supply capital as soon as the grain is thrashed. Remember that the wheat crop seldom fails in Minnesota, and especially in the Red River valley. In this valley the railroad company allows a rebate of $3 per acre on land bought of it and cultivated, thus reducing the price of the lands to the actual settler to from two to three dollars per acre, and long time is given for these payments, at seven per cent. interest. There were opened in the

State in 1878, 4,082 new farms; and in 1879, 6,929. I have not the figures for 1880. Here is an estimate of the cost of raising wheat per acre in Minnesota:

First Year.		Second Year.	
Breaking	$3.25	Plowing	$1.25
Dragging and sowing	1.00	Dragging and sowing	1.00
Seed, 1½ bushels	1.50	Seed, 1½ bushels	1.50
Harvesting	1.75	Harvesting	1.75
Stacking	75	Stacking	75
Threshing, etc., 10c per bushel	1.50	Threshing, etc., 10c per bushel	1.50
Total	$8.75	Total	$7.75

From the above, at an average yield of fifteen bushels per acre, the profit can be easily determined. In the Red river valley the expense is about $1 greater per acre; but the average yield is seldom less than twenty bushels, and frequently it is twenty-five bushels. In addition to a liberal amount of personal property, the exemption laws cover eighty acres of land (not included in any incorporated city or village) and the dwelling house thereon. Within corporations, it covers one lot and dwelling house.

Among the most important matters of concern to a settler in a new country are its markets, fuel, and water. Here water is abundant, and of excellent quality. The following is a carefully prepared table of the average prices of the principal articles of consumption, within the usual variations caused by distances from market:

Wheat	75c to $1 per bu.	Fresh fish	4c to 6c per lb.
Beef	6c to 12½c per lb.	Hams	10c to 12c per lb.
Pork	6c to 11c per lb.	Lard	8½c to 10c per lb.
Mutton	7c to 12c per lb.	Butter	18c to 22c per lb.
Venison	8c to 12c per lb.	Eggs	15c to 20c per doz.
Turkeys and chickens	8c to 12c per lb.	Pork	$12 to $14 per bbl.

Groceries, dry goods, hardware, lime, and other commodities bring Eastern prices, and no more. Horses are worth from $100 to $150 each; oxen, $75 to $125 per yoke; beef cattle, 2½c to 3c per pound; milch cows, $25 to $35 each. Wood sells in the villages at from $2.50 to $3.50 per cord.

Minnesota is destined to take a prominent place among the manufacturing States of the Union. The superior water-power, the quantity and excellent quality of its wheat, have stimulated the enterprise of its citizens to advance it already into the front rank of flour-making States. It contains some of the largest and finest flouring mills in the world. Nearly every stream emptying into the Mississippi and the Lake Superior basin presents rapid and broken descents, supplying valuable mill power. With engineering skill, the Falls of St. Anthony

alone could be made to furnish 120,000 horse power. Fergus Falls, on Red river, could supply more than 20,000 horse power; while the St. Croix Falls are but second in hydraulic power in the State. Besides these, there are Granite Falls, on the Minnesota river, Sauk Rapids, Little Falls, and others on farther up the Mississippi river, the dalles of the St. Louis river, and hundreds more. At present, only 7,000 horse power, about six per cent. of the whole, is utilized. There are 452 flouring mills in Minnesota; and of these, twenty-one are located at Minneapolis. They are justly considered as monster mills; for they consume daily 75,000 bushels of wheat, or 23,000,000 bushels per year, making about 5,000,000 barrels of flour. Over half a million barrels of flour were sent last year to foreign countries from the Minneapolis mills alone. The total shipments of flour rose from 30,000 barrels in 1860 to 1,551,789 in 1879. There are large flouring mills at Stillwater, St. Paul, Red Wing, Cannon Falls, Hastings, Northfield, and Lanesboro, and on the Zumbro river, and at Sauk Center, Mankato, and Fergus Falls.

Fifty-two counties reported 715 establishments for the manufacture of lumber, and articles chiefly of wood. These embrace 207 saw-mills, 352 wagon and carriage factories; thirty-three planing mills; fifty-four cooper shops; twenty-six shops for the making of blinds, sash, and doors; fourteen furniture factories; twenty establishments for the making of agricultural machinery; and five others for making packing boxes, show cases, and laths and shingles. Many of these manufactories are very extensive, and employ a great amount of capital and labor; and they are continually increasing in number to meet the new demands for their products coming in from all over the Northwest. Statistics furnished by the *Northwestern Lumberman* state the lumber and shingles sawed in Minnesota in 1880, as follows:

Localities.	Lumber, Ft.	Shingles.
Minneapolis, and above	237,539,000	78,914,000
On Mississippi, below Minneapolis	59,947,000	8,715,000
St. Croix river	111,380,000	52,968,000
Lake Superior	63,414,000	7,456,000
Total*	472,280,000	148,043,000

* The St. Paul *Pioneer Press* estimates the product of the Minnesota mills in 1880, as follows: Amount of lumber sawed, 450,000,000 feet; the shingles cut, 178,000,000; and the laths, 65,000,000.

Clays, sands, limestone, etc., are found in abundance; and brick, pottery, and stoneware of superior quality are manufactured in considerable quantities for home consumption and export.

In 1860 the manufacturing interests of this State were not extensive, numbering in all 562 establishments; employing about 2,123 hands, having an invested capital of $2,388,310, paying in wages $712,214, using $1,904,070 worth of material, and producing $3,373,172 worth of products. Ten years prior to this, the United States Census returns but five establishments, employing sixty-three hands, and producing about $58,000 worth of products. In 1870 the number of establishments had increased four-fold; employing 11,290 hands, and $11,993,729 capital; using $13,842,902 worth of material, and producing $23,110,700 worth of products; while over $4,050,000 was paid out for labor. The complete count has not been made of the industrial statistics of Minnesota as returned by the Tenth Census; but, through the courtesy of the Superintendent, Professor Walker, I am enabled to give the important industries of the State. From this table, which only represents 800 out of the probable 3,000 industries of the State, it will be seen that the product of the principal industries has already reached $52,270,154:

Business.	No. of Establishments.	Capital.	Greatest number Hands employed at any one time during the year.	Total Amount Paid in Wages during the year.	Materials.	Products.
Agricultural implements	28	$ 506,222	421	$ 140,457	$ 256,068	$ 662,670
Brick and tile	77	252,705	1,089	173,086	97,296	434,975
Cheese and butter	25	69,749	71	6,545	80,594	80,883
Flouring and grist mill products	437	10,592,912	2,791	1,423,146	33,124,126	43,693,516
Lumber, sawed	226	6,963,945	4,574	1,480,119	3,647,715	7,056,895
Slaughtering and meat packing	9	52,000	49	22,760	226,994	330,415
Final Total	800	$17,612,533	9,365	$3,275,113	$42,372,782	$52,270,154

The railroad system of the State is but eighteen years old. In 1862 the Hon. E. F. Drake built ten miles of railroad, now a part of the St. Paul & Pacific. This was the commencement of one of the finest systems of railroads in the country. The report of the Railway Commissioner of Minnesota for 1880, gives a list of forty-one roads in the State, with a total mileage of

2,986.04. Poor's Manual for 1880 gives the number of miles of main and side tracks at 3,006. Roads are rapidly building in all parts of the State, so that the number of miles must now exceed 3,000. These are owned or operated by eleven companies. The net earnings of the Minnesota railways for 1879, the latest figures obtainable, were $2,941,412.63; and the total number of passengers carried, 1,809,380. Of freight, 2,725,258 tons were carried from, and 2,675,339 tons received at, stations within the State; of which 298,146 tons were of flour and meal, and 494,366 tons of lumber. These railroads extend over the entire State; and you can rarely get over twenty miles from some railroad unless you go into the great forests of the northern part of the country. There are stations about every six miles along the roads, containing a telegraph and post office, and stores where everything the settler needs can be had, including usually agricultural implements and lumber.

As regards lake and river transportation, it is evident that very few of the interior States are so highly favored as Minnesota. Flowing to the north, into Hudson's Bay, is the Red River of the North, with 380 miles of navigable water, commencing at Moorhead. The great Mississippi, the Minnesota, and the St. Croix rivers, and their navigable lakes, afford unusual advantages for water-carriage for the interior and the southeastern portions of the State; while Lake Superior washes its northeastern border for fully 167 miles. The Mississippi furnishes 540 miles of navigable waters within or bordering upon Minnesota; and boats ascend the Minnesota river a distance of 238 miles from its confluence with the Mississippi, three miles above St. Paul. In all, there are in Minnesota, 2,796 miles of navigable waters, or one mile to every thirty square miles of surface. Ohio has only one to every sixty-seven square miles of surface. Until about seventeen years ago, the commerce of this country depended entirely upon lake and river transportation. This accounts for the rapid development of the southeastern corner of the State, where, as I shall show, the greater part of its wealth is now massed. The total number of vessels enrolled and licensed within Minnesota in 1879, was 101, with an aggregate of 8,243 tons. Six steam vessels, of 832 tons, and forty-eight barges, of 1,096 tons, were built within the year. The same year, 119 vessels, of 6,574 tons, with cargoes, and three vessels of 124 tons, in ballast, entered the customs district of Duluth, and eighty-

five vessels, of 15,281 tons, with cargoes, and thirty-three vessels, of 4,690 tons, in ballast, entered the customs district of Minnesota. The clearances for foreign countries amounted to 102 vessels, of 59,987 tons, with cargoes, and twelve vessels, of 309 tons, in ballast, from the Duluth district; and 115 vessels, of 19,687 tons, with cargoes, and four vessels, of 458 tons, in ballast, from the Minnesota customs district. There were 21,939 arrivals and departures of passengers by these vessels. These figures do not include the large number of American vessels engaged in the coasting trade of the lakes, and on the Mississippi, where regular lines of steam vessels ply between the ports, and immense quantities of freight are moved in barges and sail vessels.

On account of the well-drained condition of the surface, common wagon roads are easily made. Little work is required to put them in order; but bridges must of course be built over the streams. Turnpikes are, as yet, very rare.

Every part of the State enjoys excellent postal facilities. Daily mails are received at all railway stations, and most localities off the lines are served twice a week—none less than once a week. Daily papers from St. Paul and Minneapolis are carried all over the State the same day of their publication. Nothing has conduced more to the growth of the State than the newspapers. The first paper in the Territory was printed April 27, 1849, at St. Paul, by James M. Goodhue—the old *Pioneer*. Now sixty-nine of the seventy-nine counties can boast one or more newspapers published within its own bounds. In all, there are 209 newspapers published in Minnesota, of which ten are dailies, 191 are weeklies, and eight are monthlies. The ten dailies alone circulate 8,170,150 copies annually.

Besides the State University at Minneapolis, and the three State Normal schools, all institutions of merit, and steadily growing in everything essential to usefulness, Minnesota has had a vigorous public school growth. The principal statistics of this growth are as follows:

Items.	1870.	1879.	1880.	Gain, 1879-80.
Children attending school	110,590	164,606	172,442*	7,836
Special and common school districts	2,479	3,901	4,144	243
School houses	2,119	3,289	3,693	407
Teachers employed	4,111	5,007	5,215	208

* Besides 7,506 not of age, or non-residents, a gain of 467.

The permanent school funds of the State amounted to $4,050,729 in 1879; and the total school fund apportionment in 1880 was $150,485, or $1.50 per scholar. The income of school funds from all sources was as follows:

Apportioned from school funds	$150,485.00
Received from licenses, fines, and estrays	20,943.00
Received from the one-mill tax	257,000.00
Received from special taxes	900,000.00
Total	$1,328,428.00

The value of school sites and buildings, which was but $160,591 in 1863, increased to $1,582,508 in 1870; and in 1879 it had grown to $3,382,352.

There are several flourishing colleges and academies under denominational control, conspicuous among which are Carleton, St. John's, and Macalester colleges, Hamline University, and St. Mary's Hall. Besides these, there are numerous seminaries, academies, and private schools, which enroll altogether about 5,000 pupils. The State supports an asylum for the insane, an institution for the deaf and dumb and the blind, a reform school, and a wisely administered State's prison.

Religious and social privileges have kept pace with the settlement of the country, there being few neighborhoods without Christian societies. Every village has one or more churches, and all the Christian denominations are represented. Many of the churches are elegant and costly structures, presided over by liberal-minded and intelligent clergymen.

The adult population is mostly made up of native-born citizens of other States, with a strong mixture of immigrants from Germany, Sweden, Norway, Ireland, England, Scotland, and Canada, with now and then a native of France, Wales, Poland, Russia, and Bohemia. They readily affiliate with each other when once they acquire the English language. The tone of the public press and sentiment of the people is high, and general intelligence prevails. Many social advantages are enjoyed in nearly every community; and strangers are always made welcome. There is plenty of room and a promising future for thousands in the broad and smiling State of Minnesota.

The following table, compiled from the official reports of 1879, shows the distribution of taxable and cultivated lands, value of real estate and personal property, and total assessed value and taxes of the State, treated under ten divisions:

Divisions.	Total Area, Acres.	Taxable Area, Acres.	Cultivation area Acres.	Real estate Value.	Personal Property Value.	Total Assessed Value.	Total Taxes.
Lower Mississippi slope.	3,730,270	3,591,668	1,554,189	$288,169,296	$15,033,172	$72,213,477	$908,086.95
Big Woods (south).....	1,949,320	1,793,023	595,327	94,068,200	6,054,525	20,161,084	441,751.04
Des Moines slope.....	3,267,420	1,600,694	302,311	11,458,603	2,818,763	14,472,366	303,477.50
Upper Minnesota (south)	3,378,694	1,144,467	309,236	6,894,623	2,269,545	9,363,168	199,500.37
Upper Minnesota (north)	3,747,520	2,063,303	497,340	14,102,506	4,376,880	18,479,378	398,113.87
Upper Mississippi (west)	6,751,680	3,904,793	407,093	33,596,977	11,300,602	50,968,616	801,764.97
Red River slope.....	9,429,760	1,125,413	174,499	4,197,477	1,938,459	6,135,936	147,780.26
Northern counties.....	12,962,900	(not given)	.....	1,810,879	124,861	1,735,479	35,653.03
St. Croix slope.....	2,234,414	1,003,146	69,616	7,047,413	1,965,012	9,012,494	170,227.09
Upper Mississippi (east).	3,045,583	1,079,490	72,811	28,494,650	7,397,676	35,942,326	497,325.04
Totals.....	50,469,911	17,000,124	4,018,771	$189,007,494	$53,423,015	$241,782,717	$3,761,589.22

Below I show the bonded* debt of Minnesota cities of 7,500 inhabitants and upwards:

Minneapolis	$1,204,700	Winona	$177,500
St. Paul	1,519,311		
Stillwater	90,400	Total	$2,991,911

The following table shows the amounts issued for the purposes specified; indicating that by far the greater amount of the debt has been created for objects of public utility—the aid given to certain railroads constituting nearly the only exception to this comment:

Bridges	$490,621	Schools	$134,700
Fire department	35,240	Sewers	274,500
Funding floating debt	13,500	Streets	120,100
Improvement of rivers and water power	100,000	Water-works	245,000
		Revenue bonds (St. Paul)	58,100
Parks	100,000	One old war bond (St. Paul)	50
Public buildings	125,000		
Railroad aid	895,000	Total	$2,991,911
Refunding old debt	340,160		

The following shows the amounts drawing rates of interest specified:

12 per cent.	$ 6,700	6 per cent.	$861,500
10 "	163,400	5 "	45,000
9 "	6,000		
8 "	948,125	Total	$2,991,911
7 "	1,161,186		

Below I present a tabular comparison of the growth of population of the cities of 7,500 inhabitants and over, during the last three decennial periods; show the assessed and estimated true value of real estate and personal property in 1880; and give the total tax levy and the total bonded and floating debt for that year:

* No bonds issued previous to 1880. About $400,000 mature after 1900.

Cities.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Total Assess'd Value of R. E. and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of R. E. and Personal Property.	Taxation. Total Levy.	Total Bonded and Floating Debt.
Minneapolis	2,563	13,066	46,887	$23,415,782	$24,013,070	$32,017,426	$941,019	$1,304,700
Saint Paul	10,401	20,030	41,498	24,000,000	24,000,000	32,000,000	880,000	1,358,715
Stillwater	2,380	4,124	9,054	2,792,108	2,643,248	3,524,324	64,638	90,400
Winona	2,464	7,193	10,208	3,780,496	3,206,056	4,274,741	56,710	189,000
Totals	17,808	44,413	107,647	$54,988,386	$53,862,369	$71,816,491	$2,022,385	$3,004,815

Above I have shown that the real and personal property of Minnesota, in 1880, was assessed at more than $241,750,000; and was actually worth, at a fair cash valuation, not less than $350,000,000. A very handsome showing, truly, for a State which in 1850 contained no more than 6,077 inhabitants, with property estimated at only $2,500,000.* Official statistics show that the greater portion of this wealth is contained within the thirty-five counties lying in the southeastern section of the State, bounded by and including Chisago, Isanti, Benton, Stearns, Meeker, McLeod, Sibley, Brown, Watonwan, and Martin. These thirty-five flourishing counties constitute very considerably less than one-fourth of the entire area of Minnesota; yet in 1879, they produced 80 per cent. of all the far-famed Minnesota wheat, 92 per cent. of the corn, 62½ per cent. of the cattle, 89 per cent. of the hogs, 75 per cent. of the sheep, 76 per cent. of all the cheese, and 76 per cent. of the butter; and contained 90 per cent. of the orchard trees and vineyards.† Within these counties is about 80 per cent. of the entire population; and here are all the cities of 5,000 inhabitants and upwards; of which, Minneapolis contains 46,887; St. Paul, 41,498; and Winona, 10,208, persons. Within and beyond these counties, millions of acres have been disposed of by the government, which have not yet been reduced to cultivation. Besides these, there are, according to a recent estimate, over 13,500,000 acres of government lands, and 6,000,000 acres of railroad lands, undisposed of. Of the government lands, more than 2,000,000 acres are on the west slope of the Upper Mississippi, about 2,250,000 on the Minnesota slope of Red river, and nearly 9,000,000 in the northern counties. As more than three-fourths of this broad area is believed to be susceptible of profitable cultivation, it is easy to see that the settlement and tillage of Minnesota have little more than fairly commenced.

* Not stated in Census of 1880; although it gives the population.

† According to the State statistics.

CHAPTER X.

STATE OF IOWA.

Iowa is a prairie State. It has a general slope southward and eastward. An elevated strip, called the "Plateau du Coteau des Prairies," or the "Table land of the heights of the prairies," enters the State from Minnesota near the northwest corner, and, keeping nearly parallel with, and a few miles west of, the Des Moines river, passes with a varying width of fifty miles or less, southward, becoming much narrower as it bends past the sources of the Chariton river, and finally blending with the general surface of the country near the junction of the Missouri and the Mississippi rivers. The highest land in the State is within seventy-five miles of the northwest corner. Following the ridge already indicated, a series of streams have their rise, flowing to the southwestward into the Missouri, of which the Little Sioux, with its large branch, the Maple, is chief. The largest of the others are the Nishnabatona, the Nodaway, the Grande, and the Chariton. The headwaters of the Des Moines river pass near Spirit Lake, as they flow from Minnesota. Entering Iowa some ninety miles east of its northwest corner, this river empties, at its extreme southeast corner, into the Mississippi, in its course dividing the State into two nearly equal parts. Between the Des Moines and the Mississippi, the Iowa and the Red Cedar, the Wapsipinicon, the Maquoketa, the Turkey, and the Upper Iowa rivers—all taking their rise in Minnesota—and the Skunk river, rising near the centre of the State, flow in courses mainly parallel to the Des Moines. Along the ridge that forms the divide west of the Des Moines, the springs and rivulets sending forth waters toward the great boundary rivers on the opposite sides of the State are often interlocked. In the northern part of the divide the country glistens with numerous lakelets. The minor creeks, like the rivers, are well distributed, supplying an abundance of excellent water power, and rendering the natural irrigation and drainage of the State well-nigh perfect.

Iowa is almost a regular parallelogram: its northern limit being a direct east and west line upon north latitude 43° 30′, extending from the Mississippi to the Big Sioux; its southern limit, the parallel of north latitude 40° 20′ from the Missouri to the Des Moines river, and thence the Des Moines itself to its mouth; while the eastern boundary, through its whole length, is the Mississippi, and the western boundary is the Big Sioux and the swift, muddy, changeable Missouri. The State extends about three hundred miles on a west line from the Mississippi at Dubuque to the junction of the Sioux and the Missouri; which is slightly more than the average width, as the Mississippi sweeps to the eastward before reaching Dubuque from the north; and, although its curve to the east reaches some twenty-five miles east of Dubuque just above Clinton, it trends rapidly towards the west as it passes Davenport, and it leaves Keokuk, at the lower corner, considerably to the west of Dubuque. From the north to the south boundary is very nearly two hundred and eight miles. The total area of the State is 56,025 square miles, or 35,856,000 acres, being nearly the same as that of the irregularly shaped State of Michigan, with its 179 islands, or the area of Illinois, with its serpentine boundary lines, for which it presents almost the exact equivalent in a much more regular form.

The soil of Iowa in its native condition produced a luxuriant growth of native grasses beyond the wants of the herds of buffalo, elk, and deer, which once roamed over it. Year by year, the decaying surplus growth went to form a rich, deep mould to nourish the crops of the future husbandman. There is very little waste land in Iowa. The marshy spots may all be easily drained, and many of these places promise to become, in time, the most valuable land in the State. There are probably no lands so barren as to be unprofitable as pasture lands. Iowa is a healthy State. Exposure and neglect will produce fevers and wasting diseases in any fertile region, but the general elevation of this State, its usually excellent drainage, and its salubrity of climate are all favorable to health. The extremes of temperature are considerable. While the mean temperature, according to the chart of the Smithsonian Institute, runs from 44° Fahrenheit in the north, to 48° in the southern portions of Iowa, the mean temperature for the hottest week of the year ranged from 85° in the north to 90° in the south; and in the

coldest week it ranged from more than 10° below zero in the north to zero in the south.

The annual average rainfall of Iowa* for the region west of the Des Moines river is twenty-eight inches, excepting in the tier of counties along the Missouri line, where it rises to thirty-six inches. Traveling northeasterly from Des Moines City, one crosses a narrow belt running along down the river, in which the rainfall averages thirty-six inches a year; then another, parallel belt, in which it rises to forty; then a narrow strip on both sides of Cedar river, where it reaches an annual average of forty-four inches. Keeping on to the Mississippi, he again enters a belt where the rainfall is forty inches, and finally another, in which it sinks to thirty-six inches. These figures compare favorably with those of the best grain countries in the world.

Iowa has rather a higher average health record than other States of the same latitude eastward of it. Along the Mississippi and in the lower part of the Des Moines valley the elevation is less than 800 feet above the sea level, or about the same as most of Illinois. The rest of the State lies higher; and a very limited area in the northwest part rises even to 2,000 feet above tide-water. Diseases incident to the exposures of a new country begin to diminish in frequency, while those brought with close houses and engendered by bad drainage manifest themselves more than formerly, especially in the older settlements with dense population. Scarlet fever, diphtheria, and whooping-cough have scourged Iowa towns as they have done those of the older States. Consumption has become somewhat prominent of late in the early settled area along the eastern and across a considerable portion of the southeastern section of the State, which nearly corresponds with the lower levels of the land. Malarial diseases affect, in a greater or less degree, all the State except the region in the northwest corner, nearly defined by a line drawn from a little south of Council Bluffs to the Minnesota line near where Cedar river crosses it. Even within this space, the inhabitants of a small area about Sioux City and the narrow strip of rich bottom lands along the Missouri are subject in some degree to malarial affections. Intestinal diseases are common within a strip of country stretching along the western part of the State, entirely across it. This

* Statistical Atlas of the United States, 1874.

is about the only particular in which Iowa suffers in comparison of its health statistics with those of other Western States in the same latitude. A small district, including the pleasant city of Cleveland, Ohio, is only less strongly marked, in Walker's United States Statistical Atlas, as a seat of the same or a similar disease. Enteric, cerebro-spinal, and typhus fevers do not prevail in Northwestern Iowa. They occur to some extent in the rest of the State, as in the whole region eastward to the Atlantic.

In the number of her unfortunates, the blind, deaf mutes, idiots, and insane persons, Iowa has about the same proportion as neighboring States, with a little more favorable showing as regards the increase of insanity, and a little less favorable as to idiocy.

The economic geology of Iowa adds largely to its resources. The State has a share of the wonderful lead district that drew early miners to the adjacent corners of Wisconsin and Illinois. The "Galena limestone" furnishes good building stone and lime. Near Fort Dodge, on the Des Moines, west of Dubuque, are valuable beds of gypsum. The outcrops along the Des Moines and other rivers furnish good building stone, some of which, as the coral limestones, are peculiarly beautiful. The Coal Measures of Iowa are separable into upper, middle, and lower divisions. The best coal-producing portion is the latter, embracing some 6,000 square miles, of which the most accessible part occupies a district some 50 miles in width by about 175 in length, stretching along both sides of the Des Moines river, from a little above Fort Dodge, in Webster County, to Keokuk, in the southeastern corner of the State. South and west of this strip, the lower coal beds lie so far below the surface as to be worked only by deep shafting. Southwesterly from this lie the Middle Coal Measures, covering about 8,500 square miles. These produce only two or three thin, uncertain seams of coal. Beyond this, westward and southward into Wisconsin, extend the Upper Coal Measures, covering a vast district, "equal in extent to the State of Vermont," with, so far as yet discovered, but very little workable coal; the beds along the Nodaway, of a maximum thickness of twenty inches, being the only profitable ones yet developed.

The geological formation of Iowa is Carboniferous, or coal-bearing, in the region I have here roughly outlined; Cretaceous, over-

laid with drift to the northwest of the coal beds; a Devonian belt lies along the northeast of the coal beds; east and north of this lies the Silurian formation, with its limestones and its sandstones reaching beyond the State. Further investigations and discoveries will probably modify this description somewhat. The limits of coal are more positively determined toward the east than toward the west, where drift overlies much of the surface and the labors of settlers have not as yet exposed many of the permanent rocks. When deep boring is justified, workable coal will probably be found in a wider area to the southwest. Coal was reached at a depth of nearly 600 feet at Ponca, in Northeastern Nebraska, in 1880, which some suppose to be identical with the Iowa coal. The coal district outlined is part of the great coal field which also supplies so much of Missouri.

According to the natural distribution of trees in Iowa, heavy timber was limited, for the most part, to a very narrow strip along the Missouri, another on the Des Moines river, below Fort Dodge, and a broader belt along the Mississippi, reaching back to the Iowa river in the northeast, and blending with the Des Moines river belt a few miles east of Des Moines; so that the eastern and southeastern part of the State, along the Mississippi and up the Des Moines, as indicated, was about one-eighth to one-fifth covered with timber. The extreme northeast and southeast corners had about 300 acres of timber to the square mile. Red cedar trees gave name to the river along which they grew. The cottonwood was the peculiar product of the Missouri bottoms. The buckeye, redbud, and coffee tree, the pecan, the persimmon, and the sassafras, were found in the warmer bottom lands. A few black walnut groves on the streams have attracted the sharp eyes of the furniture dealers. The various oaks and maples, the hickory and ash, are mingled in the woodlands with wild cherry, plum, and other growths. Under the needs of the people and the care of the State, tree planting has received much attention. More than $2,000,000 exemption on assessments is now claimed under a law which for ten years exempts $100 for each acre of planted forest, and fifty dollars for each acre of orchard. Larch, red cedar, Norway spruce, ash, walnut, cottonwood, white willow, soft maple, cherry, and the catalpa are among the trees planted. There were over 65,000 acres of planted timber in 1875.

The use of wire for fences economizes the consumption of lumber. The barbed wire is in general use, although complaint arises of injury to animals accustomed to heavy fences. A painted strip or other broad band along the top would make a safer fence, but few have time or money to prepare it, especially as they claim that animals brought up beside it avoid it. The herd law, requiring each owner to take care of his cattle, is deemed a blessing in many localities, saving the fencing of crops. In a few cases, as where timber is plenty and fencing comparatively cheap, farmers with numerous cattle, would rather fence the crops, and let the cattle have the range. To the pioneer with only a team and a milch cow, a pen of pigs and a flock of chickens, the herd law is a great saving. In districts where crops and cattle are of nearly equal value, considerable division of opinion as to the benefits of the herd law exists, but the preponderance is in favor of its wisdom.

In early times wild turkeys were abundant in the woods along the streams; prairie grouse lighted on the fields and around the stacks of the pioneer in flocks of hundreds and even thousands; wild geese and ducks fed in the lakes and rivers, where, during the spring and autumn migrations, the sportsman still finds them in considerable numbers, together with a few herons, swans, and pelicans. The buffalo, the elk, and the deer, which once roamed over the prairies and along the wooded streams of Iowa in great numbers, have, with the exception of the latter, entirely disappeared from the State. The fallow deer, hares, rabbits, squirrels, and other small game are still found in considerable numbers, especially in the most thickly wooded districts. Formerly the streams were filled with fish of many varieties in abundance, and there is still good fishing along the Mississippi, the Missouri, and the principal rivers of the interior. The markets of the large towns and cities are well supplied with fish for a considerable part of the year. Of these, pike, muskallonge, bass, the sturgeon, and the cat-fish constitute the choicest and most valuable varieties. The numerous clear and beautiful streams of this State present good inducements for fish-culture, which is only beginning to receive proper attention.

Iowa was part of the Louisiana purchase in 1803. To its previous French owners, and to the Spanish in their temporary ownership, it had been a mere hunting ground. A Canadian Frenchman, Julien Dubuque, stopped at the lead mines to trade

in 1788. A few fur traders and half-breeds gathered about him, but the settlement, if it could be called one, did not survive his death, having been abandoned in 1810. After Missouri was formed into a State, in 1821, this vacant region lay for some years with no organized government. The close of the Black Hawk war, in 1833, and the subsequent treaty with the Indians, opened the region to settlement, and in 1833 companies crossed from Illinois, renewing the settlement at Dubuque, which miners had visited from time to time, and settlements were formed near Burlington and at Fort Madison. In 1834 the control of organized government was secured by attaching the region to the Territory of Michigan. Two years later, on the organization of Wisconsin Territory, Iowa was put under its jurisdiction. When Iowa was made a separate Territory, in 1838, the Wisconsin legislature was in session at Burlington, and adjourned, finding itself now outside its own jurisdiction. As separated from Wisconsin by Act of June 12, 1838, Iowa included all of the United States north of the Missouri line, between the Missouri and Mississippi rivers. One of the last acts of President Tyler, on the last day of his term, March 3, 1845, was to sign a bill to admit Iowa as a State, with 17° 30′ as its west boundary, and the parallel of the mouth of the Mankato, approximately 43° 30′, as its north boundary. By Act of Aug. 4, 1846, the boundaries were located as at present, and on Dec. 28, 1846, the State was so admitted; and its progress since has been phenomenal. Although so late as 1830 white settlements had hardly begun within the present limits of Iowa, by 1840 they formed a belt along the eastern boundary and had spread into the southeast corner, up the valley of the Des Moines more than half way to Des Moines City, and along the Iowa river to a point above Iowa City. By 1850 these settlements had broadened somewhat, and others had been made on the Missouri river, from Council Bluffs southward. By 1860 only the northwest corner, indicated in a rough way by a line from the mouth of the Little Sioux to where Cedar river crosses the Minnesota line, was left entirely unsettled. In 1870 population had spread, with more or less density, over all the State, except a very small area in the northwest corner.

The local government of Iowa joins some features of the "town government," the intense local democracy, with certain others derived from the "county system." This is more of a

delegated government, and obtains generally through the South. The school district also becomes, for certain questions, a democracy. "The Compromise System" of local government, as it has been termed by Dr. S. A. Galpin, in his contribution to the Hon. Francis A. Walker's Statistical Atlas of the United States, entitled "Minor Political Divisions of the United States," prevails in all States of the Northwest, except Missouri and Nebraska, which have the "county system."* By combining the privileges of the town system—the purest democracy in the land—with those of the broader and more staid "county system"—among the simplest of delegated governments—it has facilitated local development and served as a training school for the representatives of the people chosen to legislate for and administer the general and State governments. It is believed that the wonderful development of the States east and west of the Mississippi, which have chosen this system of local government, is largely due to it, for in no other part of the Union do the men of all classes take such an active and important part in everything that concerns local improvements.

The rapid progress of this State is due—next to the fertility of its soil, excellence of its climate, and energy of its industrial classes—to wise legislation, State and local, by which its financial credit has always been maintained, internal improvements rationally fostered, public instruction rapidly advanced, and immigration and capital attracted. The history of the State has been singularly free from Indian wars. The titles of the Sioux, Sacs, Foxes, and Iowas, were amicably extinguished, and they either quietly withdrew or were removed by agreement. In the war of the rebellion the State furnished her full quota, 83,000 men, and there were no braver troops sent to the front by any of her compeers. Aside from the experiences of the civil war, the history of Iowa is that of one uninterrupted march of human progress in the paths of peace; and the triumphs of such a march were never more brilliantly illustrated than in the brief period, embracing but the third of a century, within which she has risen from the condition of a Territory to one of the principal States of the republic, in population, wealth, intelligence, and virtue. The following table shows the increase of population of Iowa for the five decennial periods last past:

* Twenty-six counties of Southern Illinois are organized on this plan. They are among the oldest counties of the State, settled mostly by emigrants from the South.

Census Years.	White.	Colored.	Totals.
1840	42,924	188	43,112
1850	191,881	333	192,214
1860	673,779	1,069	674,913
1870	1,188,207	5,763	1,194,020
1880	1,614,686	9,443	1,624,620

Judging from the statistics before me, a greater proportion of all the adults of Iowa are engaged in useful employments than appears to be the case in many of the older States; and about one-half of the whole are employed in agriculture. Of its total area of 35,856,000 acres, 11,500,000 were in crops in 1880; and the total improved land was estimated at 15,000,000 acres, as against 824,682 acres in 1849. The following table shows the rate at which the principal crops of Iowa have increased in quantity by decades since 1849, stated in bushels:

Crops.	1849.	1859.	1869. *	1879. *
Corn	8,656,799	42,410,686	78,500,000	185,189,200
Wheat	1,500,591	8,449,403	23,500,000	32,786,880
Oats	1,524,345	5,887,645	19,000,000	37,256,400
Barley	25,093	467,103	1,203,000	4,290,000
Potatoes	276,120	2,806,720	4,500,000	9,090,200

* The last two columns are the statistics of the Department of Agriculture at Washington. The State statistics exceed these figures.

The Agricultural Bureau estimates the corn crop of 1880 at 207,200,000 bushels and the wheat product at 36,098,400 bushels.

The following table shows the amount in bushels of the cereal products of Iowa for the Census years 1860, 1870, and 1880, based on the crops of 1859, 1869 and 1879:

Crops.	1860.	1870.	1880.
Wheat	8,449,403	29,435,692	31,154,205
Rye	188,022	505,807	1,518,605
Oats	5,887,645	21,005,142	50,610,591
Indian corn	42,410,686	68,935,065	275,024,247
Buckwheat	215,705	109,432	166,895
Barley	467,103	1,960,779	4,022,588
Totals	57,613,564	121,951,917	362,497,131

The following table shows the total annual yield, and the yield per acre, of the nine principal crops of Iowa, averaged for five years; also the price per bushel, pound, or ton; the total value,

and the value of the yield per acre, of each crop, averaged for the same period, based on the annual reports of the Department of Agriculture at Washington:

Crops.	Total yield of crop of 1880 in bush's, pounds or tons.	Average annual yield in bushels, pounds or tons for 5 yrs., ending 1879.	Avg. price per bushel, pound or ton for 5 years.	Average annual value of crop for 5 years ending with 1879.	Avg. ann'l Yield per acre for 5 yrs., ending with 1879.	Avg. ann'l value per acre for 5 yrs., ending 1879.
Indian corn.....	78,500,000	168,789,120*	$ .23 +	$38,062,486	34.5	$ 8.09
Wheat.....	28,500,000	29,687,568	.78	23,055,420	9.9	7.81
Rye.....	540,000	449,910	.43	177,295	16.	6.62
Oats.....	19,000,000	33,367,840	.20 +	6,711,947	24.6	7.02
Barley.....	1,208,000	5,355,600	.48	2,335,708	28.	9.92
Buckwheat.....	160,000	141,750	.69	98,648	16.6	11.54
Potatoes.....	4,500,000	8,872,040	.40	3,365,013	95.	36.38
Hay.....	1,650,000	2,709,600†	4.73	12,394,212	148.†	6.90
				$86,200,729		

* The immense crops of wheat and corn produced of late years, and particularly the great wheat yield of 1880, above stated, rise far above this average. † Tons.

The product of the six cereals above named, in 1880, amounted, according to the report of Hon. John R. Schaffer, Secretary of the State Agricultural Society, to $99,006,657; the hay crop, to $18,000,000; the potato crop, to $4,726,750; grass and flax seed, to $3,034,200; to which add orchard and farm-garden products, not less than $3,500,000, and tobacco, sorghum, and broom corn, over $1,000,000, and we have a total of $127,257,600 as the value of field, orchard, and garden products of Iowa in 1880.

Over nearly its entire extent, Iowa has a rich, black loam, producing corn and grass crops with almost uniform certainty. The wheat yield has been subject to considerable fluctuation from the ordinary variation of seasons, and from the attacks of insects. Corn stands first among the products of Iowa, and wheat second. Although the latter crop must be counted somewhat uncertain, the immense breadth of new land which will for some years be devoted to wheat will keep the annual product at a high figure. A purse-shaped area, lying a little back from the Mississippi, including the Cedar river to its mouth, is the special wheat district of Iowa. A small area southeast of Sioux City is also superior. The same area has taken prominence for its oat crops. The richest corn belt extends over an area of seventy-five to a hundred miles wide, across the southern half of the State; with broad ribbons running up the valleys of all the principal rivers to the Minnesota line.

A local development of market-gardening is notable near the southeast part of the State, on Muscatine Island, where the genial warmth of the peculiar sandy soil never fails to mature abundant crops of grapes, sweet potatoes, and melons. The large cities along the river banks furnish a prompt market. The area comprises many square miles, and vegetables are sent to Chicago and other distant markets. Small fruits are raised as easily as elsewhere in the same latitude. Blackberries are not hardy enough for all parts of the State in general, but they do well at Muscatine Island. Vegetables, from the important field crops of potatoes through the ordinary list of this latitude, grow abundantly with due care. Large union establishments for canning raspberries, strawberries, and other small fruits, tomatoes and various vegetables, are doing an increasing business, even in Northern Iowa. Orchards do well in some localities, and will become more important as belts of protecting evergreens, or other trees, are more fully used.

A large portion of the agricultural wealth of Iowa is in farm animals. The principal part of its enormous corn crops is converted into fat cattle and hogs. In January, 1880, its horses numbered 778,400,* valued at $42,959,896; its mules, 44,700, worth $3,166,995; its milch cows, 724,500, worth $17,532,900; its oxen and other cattle, 1,370,400, worth $26,640,576; its sheep, 454,400, worth $1,154,176; its hogs, 2,778,400,† worth $14,892,224. This implies an increase, in ten years, of more than fifty-one per cent. in the number of horses, thirty-seven per cent. in mules, eighty-three per cent. in oxen and other cattle, seventy-four per cent. in milch cows, and eleven per cent. in the number of hogs. A decrease of more than seventy-five per cent., since 1870, in the number of sheep, marks the discouragement caused to sheep husbandry by dogs (the loss amounting to many thousands annually), and the effects of dairy farming and other more profitable local industries of recent rapid growth, combined with the competition of the cheap sheep farming of the great cattle ranges of the West and Southwest, which is gaining strength every year. I here give a table similar to those accompanying the several States already described, in which I show the annual number and value of the principal farm animals of Iowa, averaged for five years:

* U. S. Agricultural Department's Report.

† The State Agricultural Report estimates hogs at 3,500,000, cattle at 2,100,000, and horses at 900,000, for 1879.

Farm Animals.	Number in February, 1870.	Annual number of animals averaged for 5 years ending January, 1880.	Price per head avg. for 5 yrs. ending Jan., 1880.	Total annual value averaged for 5 years.
Horses	513,900	720,180	$56.98	$41,992,618
Mules	32,500	40,840	71.16	2,978,486
Oxen and other cattle	747,700	1,130,760	18.93	21,976,477
Milch cows	415,500	663,960	24.07	15,948,849
Sheep	2,008,000	961,860	2.36	2,328,979
Hogs	3,144,710	3,040,560	5.92	18,131,059
				$102,665,768

The East can not raise horses enough for its own use—the great cities of the country call for immense numbers, and this species of stock raising is now hardly equal to the demand. Iowa's geographical position and means of transportation afford her the benefit of all markets, so that her farmers have every encouragement to give attention to horse raising, and are doing so, especially to the raising of heavier carriage and draft animals. There are a good many fine-blooded horses in the State. Cattle for the butcher and for the dairy form a great interest in Iowa, and a very general attention has been paid to improving the stock. Five-sixths of the counties report short-horn cattle. A third have Jerseys, a quarter have Devons, and there are a few Holsteins and Herefords, and occasionally Ayrshires and Alderneys. English commissioners visiting America put only Kentucky, Illinois, and Ontario before Iowa for their short-horn cattle. In 1870 Iowa was seventh in the number of hogs raised; in 1880 it had risen to the second place. Poland China and Berkshire are favorite breeds in a third of the State, and Chester Whites are preferred in more than half of it. Hog cholera has been destructive in some localities in different years, but the disease seems to be feared less than heretofore, by those who are careful as to the cleanliness and proper exercise of their swine.

This whole State, with small local exceptions, bids fair to become, at no distant day, one great dairy district. The character of its soil, the distribution and quality of the water, the climate, and the eminence its dairy products have already acquired in the Western and Eastern markets, all favor the belief, that, as the careful labor of higher farming takes the place of the herding and the wholesale cropping of pioneers, Iowa will rank as one of the very first, if not the first, of the dairy States. In 1850,

Iowa stood twenty-fifth in production of butter and cheese. In 1860 she was eleventh; in 1870 she had risen to fifth; in 1880, with 52,000,000 pounds of butter and 1,500,000 pounds of cheese, she probably stands second in butter, and fourth in cheese.* The severest portion of the toil formerly incident to large dairy farms has been transferred to butter and cheese factories, materially lightening the labor of the housewife, and expanding production.

Iowa is well situated for the dairy markets of the continent. The Southern market is easy of access by river and by rail, the mining regions of the West and the great marts of the East are all within easy reach, and Iowa butter and cheese are now regularly supplied to all the large cities of the country, while considerable amounts are sold for foreign export. This industry seems to center at Cedar Rapids, but it is well distributed over the entire State. Poultry and eggs reach a much larger sum than I have seen credited to these products in any statement covering the whole State. The reports from certain localities do justice to the subject, and estimates based upon these and upon shipments made from representative counties, set the total poultry and eggs shipped in this State in 1880 at a valuation of $2,300,000. The home consumption, including that of the population of all but five of the largest cities, amounted to as much more. The total value of the farm animals of Iowa in the year under consideration is estimated by Mr. Secretary Schaffer at $111,111,946; the dairy products (over and above the milk sold) added more than $12,000,000 to this sum; the wool, $200,000; poultry and eggs sold and consumed, $4,600,000; and the apiaries, $30,000—making an aggregate of nearly $128,000,000; which, added to the value of the field and garden products, given elsewhere, makes a grand total of $255,200,000 in agricultural and horticultural products.

The energies of this great agricultural State have only recently been seriously turned to the development of manufactures. The comparison presented by the statistics of its principal industries will impress the reader with the rapid growth of its factory interests. In the subjoined table is given a carefully prepared statement of the number of manufacturing establishments, the number of hands employed, the amount of capital engaged, the

* Estimate of Secretary of National Butter, Cheese, and Egg Association, as stated by Governor Gear at the last meeting of the Association, at Cedar Rapids, March 2, 1881.

total wages paid, the materials used, and the total products of the manufactories of Iowa, in the years 1850, 1860, 1870, and 1880:

	1850.	1860.	1870.	1880.
Number of establishments	522	1,980	6,566	6,720
Number of hands employed	1,707	6,307	25,082	39,863
Amount of capital	$1,202,875	$ 7,247,130	$22,490,183	$31,400,470
Amount of wages paid	478,016	1,922,417	6,893,292	9,642,049
Materials used	2,356,881	8,612,259	27,692,006	46,220,419
Total products	3,551,788	13,917,325	46,584,822	70,271,877

The figures for 1880 are taken from the Tenth Census returns, and the small increase in the number of establishments may be in part accounted for from the fact that in the more perfect system adopted by Superintendent Walker, in 1880, all the small establishments, such as village blacksmiths and minor operatives, have been excluded from the count, and nothing but *bona-fide* manufacturing establishments included; and in part from the tendency of late for capital to consolidate. Unquestionably, the Census of 1870 exaggerated the capital then employed, owing largely to the general inflation of prices and the premium on gold. The steady advancement of manufacturing interests in the State can best be studied in the columns showing the amount of wages paid, the materials used, and the annual production. The product of Iowa's manufacture increased 292 per cent. in the decade ending in 1860, 235 per cent. in the decade ending in 1870, and upward of fifty per cent. in that ending in 1880. The following interesting table shows the annual increase of production, the per capita production of the hands employed, the increase in wages paid, and the per capita wages paid to each workman:

Census Years.	Products.		Workers.			
	Annual Production.	Increase over prev. decade, per cent.	Number Employed.	Per Capita Production.	Amount of Wages Paid.	Per Capita Wages.
1850	$ 3,551,788	.....	1,707	$2,080.72	$ 478,016	$277.10+
1860	13,917,325	292	6,307	2,206.64	1,922,417	304.81
1870	46,584,822	235	25,082	1,858.99	6,893,292	275.73
1880	70,271,877	50	39,863	1,762.83	9,642,049	241.88

Here it will be seen that in 1850 the per capita production was $2,080; in 1860, $2,206; in 1870, $1,859; and in 1880, $1,763. In

1850 the wages averaged for each workman, $277; in 1860, $304; in 1870, $275; and last year, $242. In collecting industrial statistics, the number of hands employed is supposed to be the greatest number employed at any one time during the year. This explains the low average rate of wages paid. It is only by a careful examination of the net production, after deducting the wages and materials, that a correct idea of the growing industries of the Western States can be obtained. This is shown in the following:

Census Years.	Products.	Increase over previous Decade.	Per cent. of Increase.	Net Production after deducting wages and materials.
1850	$ 3,551,783	.....	.....	$ 721,886
1860	13,917,325	$10,365,542	292	3,382,649
1870	46,534,322	32,616,997	235	11,958,934
1880	70,271,877	23,737,555	50	14,409,416

A glance at the above table reveals the fact, that the net production of the manufactories of Iowa was, after deducting wages and materials, $3,382,649 in 1860; that it nearly quadrupled in 1870, when it reached $11,958,934; and that in 1880 it had increased to $14,409,416. The following table shows a few of the principal manufacturing industries of this State, the number of establishments, number of hands employed, capital invested, material used, and products:

Business.	No. of Establishments.	Capital, Dolls.	Greatest number of Hands employed at any one time during the year.	Males above 16 years.	Females above 15 years.	Children and Youth.	Total Amount Paid in Wages during the year, Dolls.	Materials, Dolls.	Products, Dolls.
Agricultural implements	55	988,530	953	728	1	17	325,980	531,911	1,006,072
Brick and tile	259	439,789	2,646	1,816	12	159	336,154	218,917	803,207
Flour and grist mill products	681	7,564,360	2,980	2,084	4	13	722,819	15,571,687	19,884,857
Lumber sawed	321	4,950,040	5,747	4,180	13	496	1,068,344	3,035,121	6,302,840
Cheese	*241	751,283	907	630	90	35	122,000	123,135	196,051
Butter								923,659	*1,175,220
Butter and skim cheese								194,795	254,799
Slaughtering & meat packing	36	1,557,000	1,330	1,049	1	32	331,088	7,506,008	8,608,589
	1,593	16,246,202	14,963	10,497	122	754	3,484,377	28,664,233	38,311,415

* The above figures of the Census returns are far below the estimate of the Secretary of the National Butter and Cheese Association, as stated by Governor Gear in his address at Cedar Rapids, March 2, 1881, when the butter product of Iowa was placed at 52,000,000 pounds, and the cheese at 1,500,000 pounds.

Besides the general industries already named, special ones have some importance. The towns along the Mississippi have large saw-mills, where logs, rafted from the Upper Mississippi and its tributaries, are converted into lumber. In 1878 there were thirty-three of these establishments distributed at fifteen different places between Lansing, in the upper corner of the State, and Keokuk. Clinton is foremost of these, with four establishments, running thirteen gang saws, eight circular, two muley, and thirteen gang edge saws, and producing 113,000,000 feet of lumber, out of a total of 376,680,000 feet made by all the Iowa mills on that shore. The *Pioneer Press*, of Jan. 27, 1881, gives the amount of lumber, shingles, and laths, manufactured at twenty-two of these establishments in 1880; aggregating 286,384,435 feet of lumber, 94,093,000 shingles, and 53,679,650 laths; of which the Clinton Mills, employing 1,610 men (out of a total of 3,261), turned out 113,283,200 feet of lumber; 30,880,500 shingles, and 17,157,800 laths. The product of the lumber establishments at Sioux City the same year, was estimated at 8,000,000 feet; to which, add about 2,000,000 feet per year of the native cottonwoods of the Missouri flats. The above is in addition to millions of feet in barrel staves, hewn timber, and railroad ties. Oat-meal mills have been built at various points within a few years, and a number of linseed oil mills. Coal mining grew from 263,487 tons in 1869, to 1,600,000 tons in 1879. Another estimate makes the coal product 62,500,000 bushels, valued at $5,000,000. The internal revenue collected, fell from a million in 1875, to 839,000 in 1879, indicating considerably less distilling. Sorghum and glucose factories have been erected in various parts of the State, and the investments in these industries are increasing rapidly.

Even before the era of railroads, the channel of a great navigable river along the whole eastern border of Iowa not only rendered it easily accessible to immigrants, but afforded an outlet to a southern market. In low water the rapids near Rock Island impeded navigation, until the government took steps for their improvement; nevertheless, for most of the warm season, the Mississippi was a busy channel of traffic, and did much to hasten the settlement of this country. On the west border, the Missouri opened a highway to the State, but the navigation was too difficult for economical use. This fact, together with the many thousands of square miles of fertile government lands

intervening between the western and eastern boundaries of the State, retarded the settlement of the Missouri slope. Many years ago, the general government adopted plans for the improvement of the Des Moines river, spending large sums, donating considerable tracts of land, and erecting a large number of dams, to secure deep water along this avenue into the interior. Since then, the government has, at great cost, excavated a ship canal around the Lower Rapids of the Mississippi, just above Keokuk. It is a magnificent piece of engineering skill, and will greatly facilitate the navigation of the river, which, it is believed, will rapidly increase, as soon as the deepening of the channel of the Illinois river, now steadily progressing, is completed, and the Illinois and Lake Michigan canal is deepened to admit Mississippi steamers to the docks of Chicago. The length of Iowa's boundary on the Mississippi is 365 miles, and the Missouri washes its western limits for 364 miles. There were ninety vessels, of 10,231 tons burthen, registered in the Burlington and Dubuque districts in 1879, and eight new vessels, of 791 tons, were built that year. In 1880, according to the Census Bureau, the number, tonnage, value, and crew of Iowa steamers, were as follows:

Steamers.	No.	Tonnage.	Value.	Crew.
Passenger	35	6,052.36	206,450.00	576
Ferry	18	1,246.78	54,400.00	79
Towing	17	1,826.32	81,200.00	207
Totals	65	9,125.46	342,050.00	862

The table below gives the passenger traffic of the Upper Mississippi River for 1880, according to the report of the U. S. Inspectors:

Regular passenger	75,000
Excursion	10,000
Ferry	10,000
Total	95,000

Before railroads penetrated to the Mississippi river, the system of land grants to encourage railroad construction, was fully introduced, and there was little difficulty in securing such grants to encourage them to traverse Iowa. Five great roads, with as many broad ribbons of government land for their prizes, in

addition to the ordinary zeal of competition, have pushed across to the Missouri. Three of them have grouped their termini at Council Bluffs; and all of them claim a share in developing the great plains, the mountain mines, and the golden promise of the Pacific slope. A system of railroads follows down the east bank of the Missouri. Other roads border the west bank of the Mississippi southward to its great eastern bend at Clinton. A road running almost due south from the head of navigation of the Mississippi at St. Paul and Minneapolis, runs nearly centrally through Iowa, reaching the Des Moines river about sixty miles below the capital, and follows it thence to its mouth. Branches and minor tracks reach out in all directions from these grand trunks into nearly every county. Four hundred and thirty-six miles of railroad were added in 1880, making in all, 5,215* miles now in use, against 891 miles in 1865—an increase of more than 486 per cent. Of the forty-five railways in the State, fourteen reported 824,625 passengers, and 1,707,605 tons of freight carried in 1879. According to Poor's Manual for 1880, returns received from 3,558 miles of road operated in this State, in 1879, showed an equipment of 193 engines, 171 passenger, baggage, and mail cars, and 4,170 freight cars; capital stock fund aggregating $107,358,722; cost of railroads and equipments, $104,855,440; gross earnings, $8,799,380; net earnings, $4,090,732; interest paid on bonds, $1,830,855; and dividends paid on stock, amounting to $988,213. The railroads were assessed for taxation, in 1879, at $22,540,904.

The seventy-three national banks of this State,† together with a number of banks organized under the State laws, including nearly twenty savings institutions, provide liberal moneyed accommodations to traders and manufacturers; and excellent laws are in force, regulating insurance, and corporations of all kinds. The wealth of Iowa, in proportion to population, runs high, especially for a State of such sudden growth.

The assessed valuation of real estate in Iowa for 1880, was $296,254,342; the assessed valuation of personal property, $101,268,422, making a total assessed valuation of all property, of $397,522,764. Returns from ninety-nine counties of the State, received at the census office, show that real estate in

* *Railway Age*, of Jan. 6, 1881.

† These banks granted the following accommodations to their customers in 1880: 12,493 loans, of $100 or less; 7,084 of $100 to $500 each; 8,985 of $500 to $1,000 each; 2,213 of $1,000 to $5,000 each; 169 of $5,000 to $10,000; and twenty of $10,000 and over.

Iowa is assessed at about one-third of its true value, and hence the true value of real estate is $888,763,026. It is difficult to approximate the true value of personal property, but it is generally considered safe to estimate it at one-third of the real estate. Apply this rule, and we have—

	Assessed Value.	True Value.
Real estate	$296,254,342	$888,763,026
Personal property	101,268,422	296,250,000
Total	$397,522,764	$1,185,013,026

The State and local debt, as shown by the wealth, debt, and taxation division of the Census, is very small:

	1880.
Total State debt	$ 545,435
Bonded debt of counties	2,607,311
Floating debt of counties	325,165
Amount of city debt	3,257,219
School district debt	1,125,138
Total	$7,860,168

The State tax for the same year aggregates $827,305; the county tax for purposes other than schools, $3,870,981; the county tax for schools, $409,110; the school district tax, $3,704,465. These last two amounts cover all the taxation for school purposes in the State. The total taxes of cities, towns, and villages, for general corporation purposes (other than schools), are not at this writing tabulated by the census official; though the following interesting statement gives a complete exhibit of the financial condition of all cities in Iowa with a population of 7,500 and upward:

Cities.	Population	Total Assessed Valuation.	Per Capita Valuation.	Total Tax Levy.	Per Capita Tax Levy.	Rate of Taxation.
Burlington	19,450	$ 4,001,982	$206 —	$ 165,347	$8.50	4.132—
Cedar Rapids	10 104	1,674,250	166 —	62,573	6.19	3.73+
Clinton	9,032	1,430,842	158 —	43,641	4.82	3.05
Council Bluffs	18,059	2,606,400	144 —	86,011	4.76	3.30
Davenport	21,834	6,693,413	307 —	180,782	8.27	2.70+
Des Moines	22,408	4,361,090	195 —	225,894	10.08	5.18—
Dubuque	22,254	13,000,000	584 —	338,000	15.18	2.60
Keokuk	12,117	4,104,155	339 —	172,580	14.24	4.25
Muscatine	8,294	2,000,000	241 —	100,000	12.06	.....
Ottumwa	9,004	2,246,274	249 —	87,605	9.72	3.90
	152,576	$42,118,406	$276	$1,462,513	$9.44	3.39

From this we learn that the average per capita valuation in the cities of Iowa is $276; the average per capita tax levy, $9.44; and the rate of taxation, $3.39. The population of these cities at each of the last three decennial periods, the estimated true value of real and personal property, the gross and net debt, and sinking fund of each, were as follows:

Cities.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Estimated True Value of Real Estate.	Total Estimated True Value of Real and Personal Property.	Gross Debt.	Net Debt.	Net Debt Per Capita.
Burlington	6,706	14,930	19,450	$ 5,395,250	$ 7,194,106	$ 594,454	$ 188,061*	$ 6.58
Cedar Rapids	1,830	5,041	10,104	3,462,864	4,617,153	44,902	40,907	4.04
Clinton		6,129	9,023	2,949,129	3,538,105	79,988	76,088	8.40
Council Bluffs	2,011	10,020	16,369	3,377,000	4,503,766	135,400	135,400	7.93
Davenport	11,267	20,038	21,834	11,156,939	14,875,744	920,975	920,975	12.31
Des Moines	3,965	12,035	22,408	7,658,139	10,210,854	578,000	578,000	26.79
Dubuque	18,000	18,434	23,264	18,000,000	24,000,000	804,611	804,611	36.15
Keokuk	8,136	13,766	12,117	4,274,641	5,699,521	372,375	372,375	30.73
Muscatine	5,321	6,718	8,294	3,668,190	3,540,186	393,577	393,577	47.46
Ottumwa	1,632	5,214	9,004	4,139,219	5,501,[illegible]	20,795	17,795	1.97
Totals	58,871	112,329	152,576	$68,385,587	$84,514,123	$3,257,018	$2,840,727	Av. $18.61+

* The sinking funds of Burlington, Cedar Rapids, Clinton, and Ottumwa, respectively, are $405,393, $4,095, $3,882, and $3,001—which sums deducted from the gross debts of those cities, leave the net debts as in this column.

Turning to the social condition of Iowa, I observe that the population is much more largely native American than is generally supposed; indeed, it is mainly composed of settlers from the Northern States and their descendants, and the children of the early foreign settlers. Irish immigration has scattered over the State, making about two per cent. of the population, with double that ratio northeast of Cedar river. Germans form about one per cent. of the population in the new prairie lands, considerably more than that along the interior rivers, and nearly ten per cent. in some of the Mississippi river counties. There are a few Canadians, English, and Welsh, which, taken together, make perhaps a twentieth of the population northeast of the Des Moines. Large bodies of Swedes and Norwegians have settled in the counties between the Des Moines river and the Missouri, where they make nearly one twenty-fifth of the population; while in the north, between the Mississippi and the Cedar, they compose a fifth of it.

Iowa stands well in comparison with other portions of the Union as regards illiteracy. She has received from the older States and from Europe a class of immigrants of superior intelligence and thrift. Two societies in Iowa rank with the literary

and scientific organizations of the oldest and wealthiest parts of the land. The Academy of Sciences at Dubuque has done valuable work; and a similar association at Davenport has made a specialty of Indian history, having, it is said, the best collection of Indian relics outside the Smithsonian Institution.

The early settlers of Iowa established various academies and advanced schools. When, about thirty years ago, the great impetus to popular education began to quicken and strengthen the public schools of the West, Iowa was among the first to spring into activity in this cause. Some of the early academies have become colleges, under control of various religious denominations. Some have blended into public schools. The Methodist Episcopal Church controls five colleges, the Friends two, the United Brethren one, the Disciples one, the Baptists three, the Congregationalists two, the Lutherans one, and two are not denominational. The State system has at its head a State university and a State Agricultural College. The higher schools of the towns are encouraged to fit pupils for the University. Iowa has two marked features in the conduct of her public school system. One is the clear recognition of good supervision. Every considerable place is authorized to employ a superintendent who shall, like a trained foreman with a body of workmen, secure efficiency and economy in the work. A powerful influence upon even the humblest country districts is the system of teachers' institutes, conducted under the supervision of the State Superintendent. The free school system of Iowa is an honor to her. The steady advance of the people's interest in this cause is sufficiently evidenced by the statistics of the following table, compiled from the latest report of the Hon. C. W. von Coelln, State Superintendent of Public Instruction:

Items.	1871.	1880.
School districts	9,320	12,022
Number of schools	8,112	12,799
Teachers employed	14,070	21,598
Population between 5 and 21 years	466,629	598,456
Scholars enrolled	341,938	426,097
School houses	7,598	11,037
Value of school houses and lots and apparatus	$6,868,910	$9,432,359
Volumes in school libraries	11,482	22,609
Total school expenditures	$3,269,190	$5,393,631
Permanent school fund	$3,101,483	$3,484,411
Interest of permanent fund	.....	$ 262,909

But, in order to discover all that the people of Iowa do in a single year for educational purposes at home, it would be necessary to add to the pupils above enumerated, and to these items of expenditure, the pupils enrolled in, and the annual cost of, her asylums for the deaf and dumb and the blind, her State university and agricultural college, and the numerous excellent schools of various kinds, sustained by private and denominational effort. The pupils of all these institutions would swell the figures above given by some thousands in all important particulars.

Of church accommodations, the Methodist Episcopal Church affords more than twice as much as any other denomination. Then follow the Presbyterians, the Roman Catholics, and the Baptists, in the order named, the latter furnishing about one-third as many church sittings as the Methodists. All other denominations together number about as many as the Catholics and Baptists combined. Taken together, the full church accommodations in 1870 were slightly behind those of any State east of the Mississippi, and below the average for the United States, as a whole; but the Census of 1880 will show a very considerable advance in this regard.

Iowa has scarcely a feature which, taken alone, can be called remarkable. No great mountain heights inspire feelings of awe and grandeur; no lagoons or deserts scar her bosom. In her wealth of coal, and boundaries of mighty rivers, the State counts only as one of many rich commonwealths equally favored. She can not boast of forests. Precious metals do not tempt the miner for gold and silver to delve within her borders. Nevertheless, taken all in all, Iowa is a remarkable State; remarkable in her extremely small amount of unavailable area (safely estimated at less than one per cent.); remarkable in the quality and extent of her deep, rich loam, extending from boundary to boundary; in her central position, lying, as it were, over the very heart of the Union, where her political and commercial relations to the entire country must always be of commanding importance; and remarkable in her political past, never marred by any serious mistakes involving dishonor.

Although Marquette and Joliet, in their exploration of the Mississippi, looked forth over the luxuriant border of Iowa so early as in 1673, the French and Spaniards, as we have before said, left this region wholly to the aborigines. Even the transient

enterprise of Julien Dubuque did not break in upon the primitive wildness of this territory until more than a century after Marquette's voyage. Almost another half-century elapsed before civilized men showed any earnest interest in it. But since then, in the brief period dating from 1833, what marvels has the world beheld in Iowa! The unbroken wilderness of fifty years ago, with only a sparse population of roving Indians, now supports a population of 1,624,620 souls, or half as many as the entire Union a century ago, gathered hither from the most enterprising districts of Europe and America, and blended into one of the strongest and most completely assimilated States of the nation. Not only this, but she exports an immense surplus. Her beef and pork are meat for the artisans of our Eastern States and for the hungry of Europe; and her corn and wheat are bread for them. She even furnishes butter for the bread. Less than a quarter of a century ago, in 1856, the first locomotive that ever reached Iowa entered Davenport, and forthwith started westward. Now five grand trunk lines of railway stretch from river to river; others link the State to Minnesota on the north, and to Missouri on the south, leaving scarcely a county without some miles of iron track; and, with sinews of steel, this youthful giant of the West clinches firm hold on all the great national transportation routes of the land. The prints of Manchester and Lowell, and the silks of Lyons, are exchanged for the gold of California across her borders; and the mails of Australia have found their quickest way to Europe across these Western prairies. Although even now in the forefront of our agricultural States, scarcely three-fifths of her soil has been brought into cultivation. If the imperfect methods of pioneer farming show such results, what shall be the product of this broad and fertile land when better methods have been introduced, and all the soil is made to contribute?

Meantime manufactures are growing, and the miscellaneous industries that enable a people to live upon its own products are expanding. With judicious husbanding of natural resources, with wise fostering of industrial pursuits, with a continuation of that financial integrity that has always marked the State, and with the standard of morality and of education ever advancing, what limit can there be to her future prosperity? So long as the West beyond her was only a savage wilderness, and so long as the highways of commerce were confined to the

channels of the rivers and the lakes, this State suffered disadvantage in comparison with others farther east. But the transcontinental railways, the settlement of the Great Plains, and the mining wealth of the mountain States and Territories, have so changed the state of affairs, that it is not strange the people of Iowa claim that the greatest possibilities of this century for any State of the Mississippi valley are now within her reach. Excepting only the ever-growing commercial supremacy of Chicago, there is, perhaps, nothing in the character of Western prosperity which she may not hope to rival or surpass.

CHAPTER XI.

STATE OF MISSOURI.

MISSOURI embraces an area of 69,415* square miles, or 44,425,600 acres, lying next west of the Mississippi and Des Moines rivers, from where the latter crosses the parallel of north latitude 40° 30′ to where the former crosses the 36th parallel. The Missouri and Arkansas line follows this last-named parallel some thirty miles, to the St. Francis river, which it ascends to the parallel of 36° 30′, the common boundary of these two States, thence to the east line of the Indian Territory, the meridian of Kansas City (94° 25′ west). This meridian forms the west boundary of Missouri until it strikes the Missouri river, which is the boundary thence to the Iowa line, the parallel of 46° 30′. The State is about 208 miles wide at the north, and 312 at the south; and, with the exception of the small, irregular projection between the Mississippi and the St. Francis rivers, it is 277½ miles from north to south. Unlike the comparatively level States of Illinois, Indiana, Iowa, and Kansas, much of Missouri presents an irregular surface, broken, and in places mountainous. Within an area about a fifth larger than Illinois, it shows a greater variety of surface, soil, and products, than all the States to the north and east of it as far as the Great Lakes and the western boundary of Pennsylvania. Land of the general level of Illinois (averaging about 800 feet above tide level) extends along the western base of the Ozark Mountains; also on both slopes of the Osage river for the most of its course, and on both sides of the Missouri from the Kansas to the Chariton, about seventy miles due east; also over nearly the entire area between the Chariton, the Missouri, the Mississippi, and the Iowa line—an extension of the high, grassy plains of that State; over a small area south of the mouth of the Missouri; and over about 600 square miles in the southeast corner of the State, between

* Statistics of the Tenth Census. According to the Report of the Commissioner of the General Land Office, the area is 65,350 square miles, or 41,824,000 acres.

the Mississippi and the passage of the Big Black river into Arkansas. In the extreme southeast are limited areas of nearly the only swampy land in Missouri, lying hardly four hundred feet above the sea. High rolling pasture lands reach in from Kansas, between the Missouri and the Osage rivers, and over a small area south of the Osage. A little to the east of the mouth of this stream, the continuation of the Ozark ridge reaches the Missouri. This is a mountainous range in part, running from near the center of the State, in nearly a southwest course, into Arkansas. From this ridge to the southeast, including Pilot Knob, is an elevated region, including many knobs rising from 500 to 1,000 feet above the adjacent level. This high land reaches the Mississippi, just below the Meramec, in bluffs of limestone, sometimes 360 feet high. Extending over four and a half degrees of latitude, and with such diverse surface, naturally enough Missouri has a great variety of soil and climate. The low lands in the southeast are extremely fertile, and are almost semi-tropical in their products—prolific both of corn and cotton. The land of West and Northwest Missouri, bordering the pasture lands of Kansas and Iowa, ranks next in fertility. The low lands of the Osage valley and the counties lying next to the Indian Territory, with all the low level northeast of the Missouri, below the mouth of the Chariton, form another grade of rich farming lands only a little less productive. The hills between the Osage valley and the low lands of the southeast corner, rising from 1,200 to 1,500 feet above the sea, are mostly barrens, or of thin soil, producing but twenty to forty bushels of corn to the acre.

Watered and drained by the two grandest rivers of the continent, the one forming its eastern boundary through a reach of nearly five hundred miles, the other making more than a third of its western boundary and then sweeping majestically across its entire breadth; with the Grand, the Platte, the Chariton, and several other rivers and their tributaries, thoroughly watering the region north of the Missouri; with the strong and beautiful Osage and its numerous feeders coming out of the southwest to join the Missouri near the centre of the State; with the Upper White and the St. Francis in the south, and the Des Moines, Cuivre, Salt, and Meramec in the east—Missouri is remarkably favored in the grandeur and extent of its navigable waters. When the improvements of the Illinois river, now progressing, are finished, and the Illinois and Michigan canal is

deepened and broadened to admit Mississippi steamers of 2,000 tons burthen to where they can transfer their cargoes directly into the huge vessels of the Upper Lakes and the St. Lawrence, the peculiar water privileges of this State will be more fully realized. There are fifty-six considerable tributaries of the rivers above named contained for the most part within the State. Many of these have strong currents and numerous rapids, offering excellent water-power, capable of driving thousands of water-wheels. The Missouri is a turbid stream, freighted with the various alluvial washings of its numerous tributaries and the 2,900 miles through which it travels to reach the Mississippi; but the Mississippi, and, especially, the most of the interior rivers, are clear, almost transparent streams, of the most wholesome character. Good water is easily procurable by digging or boring, except in some portions of the highlands of the Ozark regions. There are some localities where a tenacious subsoil holds water so well that cisterns can be made without the use of cement; and here rain-water is often the main dependence for household purposes. In the lagoon district of the southeast projection of the State, the water is apt to be brackish.

The geological and mineralogical resources of the country stand in interesting relations to these divisions according to soil. The coal field, more particularly described in Iowa, continues under Northwest Missouri, extending south of the Missouri river and underlying a large district between that river and the Osage above the mouth of the Grand. Detached beds of coal occur below the Grand, along the south bank of the Missouri to the mouth of the Osage, some of them being of unusual thickness. St. Louis is favored with coal beds at her door. Isolated spots show coal north of the Missouri, as far down as St. Charles county. The coal-bearing part of Missouri, therefore, lies mainly west of a southward curved line leaving the Iowa boundary at the Des Moines river, and passing out of the State twenty miles north of the south line of Kansas. It contains over 23,000* square miles. The heaviest coal-producing counties in 1870, were: St. Louis, 444,642 tons; Macon, 75,282 tons; Ray, 43,844; and Randolph, 27,200 tons; making together 95 per cent. of the whole. The annual product of the coal mines has nearly trebled since that year; but the relative rank of the localities above named has not altered materially.

* Professor Swallow estimates it at 36,887 square miles.

The Coal Measures are divided into the upper coal series, 300 feet thick; the middle, 200 feet; and the lower series, 150 feet thick—or 650 feet in all; but, on the line of the Hannibal & St. Joseph railroad, the Coal Measures often attain a depth of 739 feet. This is in addition to the Carboniferous limestone; consisting of the ferruginous sandstone, from 200 to 500 feet thick; the St. Louis limestone, about 250 feet; and the encrinital limestone, 175 to 500 feet thick. The upper coal series contains no valuable seam. The middle series has a seam of bituminous coal two feet thick, worked at Wellington, Lexington, and various points on the Missouri river. The lower series, as in Iowa, is the most important and productive. In this, seams varying from one foot to six and seven feet in thickness are worked profitably, and to a continually increasing extent. Singular deposits of an excellent variety of bituminous coal exist along the Osage river, called "the Osage coal pockets." These are of limited extent, but often of remarkable thickness; some of them being twenty, forty, and even eighty feet thick. They occur in ravines or valleys of denudation, not at all associated with what are known to scientists as coal-bearing rocks, and are looked upon by geologists as altogether anomalous. Although not by any means equal in quality to the Pennsylvania coals, the product of the Missouri coal beds is a rich inheritance to this region of country.

The rough tract of country between the Osage valley and the low lands in the southeastern corner of the State is rich in mineral ores. Here are found those masses of iron ore, Iron Mountain, Pilot Knob, and Shepherd Mountain, with other knolls and beds of iron not yet so well known, constituting an almost inexhaustible supply, of superior quality. Here, too, are the rich lead mines of Potosi and neighboring localities, which have produced many tons of this metal. The lead-bearing rock underlies thousands of square miles (according to some authorities, 15,000), in which workable ore has been discovered in many places. Zinc is found associated with the lead in very considerable quantities. The mining and smelting of these ores take rank among the first industries of the State, as I shall show more explicitly further on. Nickel, cobalt, silver, and copper occur in this same district, which may be said, without the slightest exaggeration, to be one of the most remarkable and valuable mineral sections of the globe. Another district of very rich lead mines, with some copper and silver, lies in the counties

southwest of the Osage, towards the Kansas line. Outside the Carboniferous formation, Missouri is mainly Silurian, with alluvial deposits in the low lands next the great rivers, and with narrow outcrops of Devonian rocks at various places along the borders of the Carboniferous formations. Drift covers much of Northern Missouri. A few peaks of Azoic granite project in the southeast highlands. Steatite, potter's clay, and mineral paints are to be added to the mineral products of commercial value; also building stone of great variety, but principally sandstones, limestones, and granite.

Tree planting is encouraged by a small bounty on each acre. The State is too well supplied with natural timber for much effort in planting. In a tier of counties along the northwest of the Chariton and in several counties at the southwest, the natural growth would average eighty acres to the square mile or section. In the rest of the State north of the Missouri river, except immediately along its banks, also west of the Ozarks, except in the southwest corner and the vicinity of the Missouri river, also along the Current river, timber originally constituted about 175 acres to the section. For the rest of the State, along the north of the Missouri and southeast of the mouth of the Grand, there were about 300 acres to the section, or nearly half, in timber. The elms, hickories, walnuts, maples, and oaks of the north grow vigorously. The trees that love a warmer soil, such as pecan, persimmon, redbud, and cottonwood, grow scantily in the most favored northern spots, but become abundant farther south. In the warm, moist bottom lands in the southeast corner of the State, sycamore, or buttonwood, attains to six feet or more in diameter, the cypress is very common, and of good size, and cottonwoods grow to proportions that would astonish those who have seen them only in northern districts. Here they rival the huge sycamores. Canebrakes, a feature not remarked in other Western States, appear along the lower river bottoms. Sweet gum and black gum trees add much to the beauty of the October foliage. Pines grow on sandy hills southeast of the Ozarks; and red cedars occur in the southwest. Missouri obtains large quantities of hardwood lumber from her own forests; and manufactures many million feet of pine every year, from logs floated down the Mississippi from Wisconsin and Minnesota. The Canton and Hannibal saw-mills cut 22,500,000 feet of pine lumber in 1880, 8,300,000 shingles, and

5,750,000 lath. There are about 1,100 saw-mills in the State, employing over 5,000 hands, and turning out an annual product valued at about $9,000,000, the greater part of which is hard wood. Native nuts, plums, grapes, and berries were formerly very abundant; and in early times quantities of wine were manufactured by the French from wild grapes.

In the open prairie States, large game disappears rapidly before the march of immigration. The broken regions of Missouri still preserve a few elk, considerable herds of deer, bears, wolves, cougars, and wild-cats. Here, too, are found numbers of fur-bearing animals—foxes, mink, muskrat, otter, marten, and occasionally beaver. Opossums, raccoons, rabbits, red and gray squirrels, gophers, and the small wood and field rodents, abound. Snakes of many species are numerous in sparsely wooded districts; the rattlesnake, massassauga, copperhead, adder, and hoop snake being the most noxious of these. Lizards, toads, frogs, water turtles, and tortoises are common; and in the extreme south, a small scorpion. Birds of brilliant plumage flit through the groves and orchards, such as the paraquet and red cardinal; song birds—the thrush, mocking bird, and other varieties—fill the woods along the southern border with melody; game fowl are taken in great numbers—grouse, quail, partridge, pigeon, snipe, plover, and occasionally wild turkeys, ducks, brant, and wild geese; swans, herons, cranes, and, among birds of prey, hawks and owls of several species, vultures (turkey-buzzards), and now and then eagles, are captured. The game business of St. Louis for the winter of 1880–81 is estimated at a million dollars. Quail and grouse, venison and turkeys, are shipped from here even to Europe. This city is still the Western centre of the native fur trade; the American furs received here amounting to two millions or more in a single season. Fish of many species abound in the Mississippi, Missouri, Osage, and smaller streams. Among these, the cat-fish (sometimes weighing 100 to 200 pounds), the pike, buffalo-fish, perch, sun-fish, bass, and suckers are the principal food kinds. While the fish of this latitude are less desirable for food than those of colder waters, they constitute a valuable article of diet; and the markets of St. Louis, Kansas City, Jefferson City, and all the larger towns, are well supplied with them.

North of a line starting on the Missouri river near St. Joseph, curving south to the mouth of the Chariton, and thence north-

ward again to Hannibal, on the Mississippi, the annual temperature averages 48° Fahrenheit. For the rest of the State it averages 56°, except in the southeast corner, where it rises to 60°. According to the markings of the United States Signal Service, the mean temperature of the hottest week of the year 1872, in Central Missouri, was 90°, and the mean temperature of the coldest week of the following winter was zero. In midsummer the heat of Central and Southern Missouri tests the endurance of the white race almost as severely as the temperature of the Gulf States, which is materially modified by the sea breezes. Cool nights during most of the summer, and the mildness of the winters, compensate to a great degree for the discomfort of the hot summer days. The winter temperature is more changeable than it is farther north, which to some degree offsets the comfort of the higher average temperature of this season. Northern Missouri is very similar in climate to Southern Iowa, described elsewhere. Except along the Mississippi river, the rainfall north of the Missouri is from twenty to thirty-two inches annually. Through a belt from sixty to eighty miles wide along the Kansas border from Arkansas to Kansas City, throughout a narrow strip along the north side of the Missouri river, and a wide belt of seventy-five miles or more along the south side of that river entirely across the State to the Mississippi and up the right bank of this river to the Iowa line, the rainfall ranges from thirty-two to forty-two inches. All the remainder of the State, except the extreme southeast corner, has an average annual rainfall of forty-four to fifty-six inches.

According to the latest published vital statistics of the United States, a small area of Missouri, near the Mississippi south of Hannibal, seems almost absolutely exempt from consumption; while, strangely enough, the greatest mortality from this cause appears to have been within a very small area next the Des Moines river, less than a hundred miles farther north; which suggests the possibility of this difference being due to other than climatic causes. The main portion of the State north of the Missouri, a few counties on the Kansas border well down towards the Indian Territory, and a district east of the Ozark mountains, but south of the latitude of Cape Girardeau, are but slightly afflicted with consumption. There is more of it in the rest of the region south of the Missouri, and in a very narrow belt on the north of the river, from the Grand to its mouth.

Malarial diseases are light in most of the lower lands northeast of the Missouri, in an area of some hundreds of square miles northeast of Kansas City, and along the southern part of the Ozark mountains. They prevail more in the northwest high land, in a belt across the low lands northeast from Jefferson City to the Mississippi, and in a limited area west of the Current river down to where it flows into the Arkansas. In the valley along the west slope of the Ozarks and in the parts of Missouri not defined already, including the land close in the forks of the two great rivers, these diseases prevail most. Intestinal diseases average less than in States north and east, except for a few miles southeast of Kansas City; and the mortality from this class of diseases, in the extreme southeast and in the great belt of low land from the northeast to the southwest corner, is much below the usual average. Enteric, cerebro-spinal, and typhus fevers exceed the average in the United States in the valley of the Osage, and are still more fatal in a considerable area about Pilot Knob and to the west of it; while around the headwaters of the White river, in the southwest, and within a radius of thirty or forty miles around St. Louis, they are very far less than the average. The general average health of the State is really about the same as that of the districts north and east of it. It seems probable that the vital statistics of the Tenth Census, not yet published, will modify the above indications derived from the Ninth Census. The ratio of the blind to the total population was almost the exact average for the United States, except among the very young. The State ratio of deaf mutes corresponds with the national average. Insanity at the age of forty stands at a little above the national average; idiocy at, or very near, the national average.

Marquette and Joliet,' in 1673, and Hennepin and La Salle, within the next eleven years, had made discoveries along the Mississippi, giving France a claim in this region. Yet it is not clear that the eastern lead mines were reached till 1720, or that a permanent settlement, that of Ste. Genevieve, was made till 1755; while it was 1763 when Pierre Laclede established a trading post where St. Louis now stands. In this same year France transferred all her claim to Spain; whose brief occupation was closed by retransfer to Napoleon in 1800. In 1803, Missouri, with all the rest of the Louisiana tract, from the Gulf to and including the most of Montana, passed by purchase to the United States.

Property titles of all kinds that were valid under Spanish and French laws were confirmed by the act of cession. Very few land titles trace back to the Spanish domination. The French bestowed large tracts of land upon their communities for public supply of fuel and for pasturage. The right of the municipality of St. Louis to subdivide and sell the lands thus conferred on that little French hamlet of pioneer times has since materially lightened the burden of public works; as the income from this source has been considerable. Almost immediately after the acquisition of Louisiana, all that portion of it not now included in the State of Louisiana, an immense area estimated at 1,134,329 square miles, was, by Act of 1804, constituted a district, under the name of "The District of Louisiana." This, for administrative purposes, was attached to Indiana Territory, which was separated from it only by the Mississippi. On March 3, 1805, all this became the Territory of Louisiana; and June 4, 1812, it was re-organized as the Territory of Missouri. By Act of March 6, 1820, and resolution of March 2, 1821, completed by proclamation of Aug. 10, 1821, Missouri was made a State, with its present boundaries, except in the northwest corner, where the limits were not extended beyond the meridian of the mouth of the Kansas river, so as to take in all between that meridian and Missouri river, until June 7, 1836. The State gained admission as a slave State only after a great struggle, ending temporarily in what is known in the national history as the "Missouri compromise." This had the effect to establish a slave State, bounded on three sides by territory consecrated by the same act as free soil. As a consequence, Missouri was for years complicated in the various movements of the great free and pro-slavery parties. Divided within herself by two contending factions, opposed in policy to that section of the country to which she naturally belonged, disparaged by the South and by the North—her prosperity was long retarded to a degree only partially expressed by the statistics I shall soon give compared with those of States her juniors in years if not inferiors in natural resources. When the strife culminated in the "War of the Rebellion," a double government distracted the State for some time, adding, in some parts of the country, anarchy to the ordinary inflictions of war. Some of the sharpest conflicts of the struggle occurred in Missouri. The authority of the Federal government was at last restored; but in some places the

ranklings of partisan strife have not even yet entirely ceased.

In 1790, two or three diminutive villages contained the white population of Missouri. In 1800, the settlements had spread thirty miles towards the Missouri. In ten years more they had slightly expanded, and occupied the narrow peninsula within the forks of the Missouri and Mississippi. By 1820, the population reached up the Missouri to the Osage; up the Mississippi for fifty miles above the mouth of the Illinois, and down the Mississippi to the limits of the State. In 1830, the broad bands of settlement along the two large rivers filled the centre and nearly all the eastern part. In 1840, only a few counties in the Northwest along the Iowa line, and an area on the south boundary, between the Ozarks and the Current river, were left almost entirely unsettled. Part of this southern tract was still unoccupied in 1850. In 1860, settlements had been made in all sections of the State. The table below shows the population at each of the decennial periods from 1810 to 1880, inclusive, as given by the U. S. Census Bureau; together with the population in 1848, 1852, and 1856—an era of peculiar interest—as shown by the State Census:

Census Years.	Total Populat'n	Males.	Females.	Whites.	Free Colored.	Slaves.	Density.	Ratio of Increase.
1810.....	20,845	11,300	9,455	17,227	607	3,011	.02	.....
1820.....	66,586	36,244	30,043	55,988	347	10,232	1.08	219.45
1830.....	140,455	74,129	66,327	114,795	569	25,091	2.15	110.94
1840.....	383,702	203,008	180,697	323,888	1,574	58,240	3.97	172.19
1848.....	595,971	327,935	261,706	510,435	1,779	79,757	5.01	55.39
1850.....	682,044	357,838	324,213	592,004	2,618	87,422	10.44	77.79
1852.....	724,667	402,595	323,072	624,914	2,868	96,877	11.09	6.21
1856.....	811,001	406,908	414,099	698,744	3,572	101,685	12.39	25.70
1860.....	1,182,012	632,601	559,811	1,063,489	3,572	114,951	18.09	72.30
1870.....	1,721,295	866,947	854,948	1,603,146	118,071	.....	20.34	45.62
1880.....	* 2,168,804	1,127,494	1,041,310	2,023,589	145,336	.....	†61.30	26.04

Professional and personal service, manufactures, commerce, and transportation, employ about one-fourth of the population; the schools enroll rather more than one-third; and fully another third are engaged in agriculture—the leading industry of the State. The ratio unaccounted for in useful occupations is rather less than that for the country as a whole.

This table shows the total annual yield and the yield per acre of the nine principal crops of Missouri, averaged for five years; also the price per bushel, pound, or ton, the total value,

* Of whom, 1,907,564 were native born, and 211,240 were foreign born.

† On the basis of the Census area. The estimates of density for all but 1880, are based on the area reported by the Commissioner of the General Land Office.

and the value of the yield per acre, of each crop averaged for the same period:

Crops.	Total yield of crop of 1879 in bush'a, pounds or tons.	Average annual yield in bushels, pounds or tons for 5 yrs., ending 1879.	Avg. price pr. bush., pound or ton, for 5 yrs. ending 1879.	Average annual value of crop for 5 years ending with 1879.	Avg. ann'l yield per acre for 5 yrs., ending with 1879.	Avg. ann'l value per acre for 5 yrs., ending 1879.
Indian corn	80,500,000	113,700,360	$ .26+	$30,406,214	31.3bu.	$ 8.38
Wheat	7,500,000	18,672,520	.90	16,953,307	12.0 "	11.01
Rye	325,000	707,220	.56	393,564	15.1 "	8.45
Oats	6,500,000	17,833,624	.23+	4,159,188	28.0 "	6.52
Barley	300,000	442,500	.79+	352,875	18.0 "	14.45
Buckwheat	75,000	54,350	.61+	67,629	17.8 "	11.07
Potatoes	2,000,000	6,052,560	.41+	2,543,528	88.0 "	36.98
Tobacco	18,500,000	30,329,525*	.05.7	1,902,701	7.64 lbs	43.58
Hay	750,000	1,084,482	8.33	8,256,478	1.34 T.	11.01
Total				$64,935,434		

The total yield of corn in 1879 was 141,739,400 bushels, against 80,500,000 in 1869—a gain in ten years of 72 per cent. The yield of wheat the same year was 26,801,600 bushels, against 7,500,000 in 1869—an increase of 257 per cent; rye produced 804,100 bushels in 1879, against 325,000 in 1869; oats, 15,429,120, against 6,500,000—an increase of 122 per cent. in ten years; buckwheat, 56,000 against 75,000—a marked decrease. The potato crop of 1879 was 6,897,800 bushels—a gain in ten years of 245 per cent; hay, 1,053,000 tons, against 750,000 tons in 1869.

The principal cereal products of Missouri in 1879 are given below from the statistics of the Census Bureau, and compared with the figures of the same bureau for 1870 and 1860:

Crops.	1860.	1870.	1880.
Wheat	4,227,586	14,315,926	24,966,627
Rye	293,262	559,582	535,426
Oats	3,680,870	16,578,813	20,670,958
Indian corn	72,892,157	66,084,075	202,485,723
Buckwheat	182,292	86,252	57,640
Barley	228,502	269,240	123,031
Totals	81,504,669	97,793,338	248,839,405

Wheat nearly always yields a fair crop; but the average product is heaviest in the counties near the mouth of the

* The Census Bureau estimates the crop of 1880 at only 11,904,077 pounds.

Missouri. St. Louis flour sustains a high reputation all over the world; having for some years commanded a premium above most, if not all, other brands for foreign shipment. This State, like the southern portions of Illinois, Indiana, and Ohio, lies directly across the best winter wheat belt of the United States, where that grain reaches its highest maturity. For this and other reasons, the flour manufactured from it endures the test of long sea voyages without fermentation. Until the late civil war the flour of Richmond, Va., manufactured from the harvests of the eastern limits of the winter wheat belt, had held almost a monopoly of the flour trade with India, China, and other warm countries. Then these countries were reached from the Atlantic only by a sea voyage of from three to four months, in which the tropics had to be crossed twice—an ordeal that none but the best flour can endure. When the war excluded Richmond flour from the New York market, St. Louis winter wheat flour took its place, and has maintained it, in the main, ever since. Oats do well, especially from the northeast corner of the State to the Upper Osage, and south of the Missouri from the mouth of the Osage to the Mississippi. The yield seems to be very light in the mineral regions southeast of the Ozarks. Corn is lightest in a narrow strip from Booneville, on the Missouri, to Hannibal, on the Mississippi. It is heavier in the rest of the district east of the Chariton, and in the oat district south of the Missouri. It is still heavier west of the Chariton, in half a dozen counties southeast of Kansas City, and along the border of Arkansas, east of the Ozarks. It is heaviest of all in the northwest angle, between the Iowa line and the Missouri river. Hay excels in a small area between the Nodaway and the Grand, next the Iowa line. It makes a fair crop in the west of the State, except in a belt of a few miles along the south side and east of the Ozarks, where it is rarely profitable.

Cotton is raised in the southeast counties, and on the headwaters of the Gasconade, in the mineral district. In 1870, this crop only aggregated 1,246 bales; in 1880, according to the Census Office, it reached 19,733—an increase of 1,483 per cent. Owing, undoubtedly, to the concentration of cotton culture upon the most fertile lands, and from the fact that the area of production embraces, almost exclusively, the highly fertile lowlands lying at the head of the great "St. Francis bottom,"

in the northeastern corner of the State, Missouri stands at the head of the list in average yield per acre, producing $\frac{44}{100}$ of a bale (of 475 pounds) to the acre. Tobacco is an important crop in this State, which ranked ninth in this product in 1880, when 15,521 acres were planted, and 12,015,657 pounds produced—an average of 774 pounds per acre. It is especially cultivated in the rich lands along the Missouri, below the Grand.

The cultivation of amber and other sorghums bids fair to be a large interest. Castor beans are an important crop in a few counties. Missouri stands second among our hemp-producing States. The rye crop is large. In domestic wines the State ranks next to California. Ordinarily apples and small fruits produce abundantly. Peaches, nectarines, grapes, plums, cherries, and berries excel south of the Missouri river, and pears in limited districts. No locality seems to have developed such market gardening of small fruits and vegetables for distant markets as the general fruitfulness of the orchards, vineyards, and gardens, would lead one to expect. There is a profuse supply for the local markets, when fruits are in full season; but as yet little enterprise appears to be shown in the business of packing and exporting. Choice berries, luscious peaches, and good apples perish where they grow when the demands of the home market have been met; and prices naturally droop to where they fail to repay the labor of marketing. As soon as a few enterprising fruit growers and shippers contrive to make proper use of the increasing facilities for quick transportation, Missouri fruit gardening will assume important proportions.

The following table shows the number of farm animals in this State averaged for five years; also the price per head and the annual total value averaged for the same period:

Farm Animals.	Number in February, 1870.	Ave'ge number of animals averaged for five years, ending Jan., 1880.	Price per head avg. for 5 yrs., ending Jan., 1880	Total annual value averaged for five years.
Horses	460,000	610,460	$41.92	$25,557,426
Mules	80,200	164 990	49.44	8,056,051
Oxen and other cattle	703,000	1,203,060	16.91	20,160,989
Milch cows	357,000	480,420	20.13	9,626,659
Sheep	1,679,000	1,334,580	1.80	2,405,608
Hogs	2,300,000	2,491,460	4.23	10,195,817
Total				$76,202,545

The farm animals of Missouri differ in quality very materially. There were two classes of early settlers; of whom one sort seem never to have experienced any desire to improve either themselves or their stock. They take the provincial cognomen of "Pukes"—and appear to be proud of it. The State is certainly to be congratulated that the ratio of this class to the whole population is continually diminishing. With them, or their ancestors, migrated across the Mississippi certain animals, which, left to take care of themselves, are now as peculiar as the majority of their owners. There is the long, lean, lank, almost wild hog, not inaptly characterized "the wind-splitter," fattening on mast, running at the approach of human foot-steps, and which has to be shot like wild game, at slaughtering time. There are "scrub horses" out-ranked by Indian ponies and Mexican mustangs. There are "scrub cows," also, whose owners divide the milk with calves kept tied near the house all the season to entice them home from the open, woody range every night. Stock of this kind is scarcely ever seen in some parts of the State; and it is passing away from certain other regions. Fine horses and mules have always been the pride of Missouri; and another class of the early settlers, quite different from the one above alluded to, introduced choice cattle many years ago, and have exerted themselves to improve their herds. In the fine grazing counties of the northern part of the State, careful attention is given to cattle for dairy purposes. In the old, rich counties along the Missouri, fine short-horns are found. In the rich districts along the Osage, and the Kansas boundary, fine cattle for dairy farming, and for fat beef, abound. Herefords, Holsteins, Jerseys, Devons, appear in the lists of the cattle exhibits of the county fairs, from nearly all over the State. Horses for the saddle have always been more esteemed than in the prairie States; and now some of the best varieties of draft and carriage animals are raised. Sheep do well. The State has raised them in increasing numbers for a long term of years, and of late with increasing regard for quality.

The northern part of the State is well adapted to butter and cheese making; and a rapid development in dairy farming has taken place in the northwestern counties. Butter and cheese factories are almost unknown south of the Missouri river. Not 500 pounds more of cheese were made in 1870 than in 1850; but in

butter a great and steady increase took place, and the product is still growing, although not so rapidly as that of Iowa. The northern counties furnish immense quantities of eggs for shipment. This is learned in part from the statements of commission merchants in the large cities, and from reports of station agents; but the business is so covered in other accounts that the real magnitude of the traffic in poultry and eggs is not readily measured. Missouri is one of the first of the honey-producing States, standing fourth in this regard.

The total value of the farm products of the State in 1870, was estimated at $103,035,759; for 1880, they may be safely estimated at not less than $158,000,000 in value.

North of the Missouri, the soil varies in quality, but the greater portion of every county is esteemed good land. The river counties of the northwest have heavy timber and rich bottom lands. In Platte, one of the oldest and richest of these, prices ranged, in 1879, from $10 to $20 per acre.* Of the counties bordering the north shore of the Missouri, Ray reported two-thirds of its area in plowed land and meadows, valued at $15 per acre. Along the Mississippi, Clarke reported prices at from $8 to $12 per acre, and half of the county under cultivation. In Marion county, there were 200,000 acres under cultivation, estimated to be worth $2,382,770, and 78,040 acres uncultivated, valued at $390,200. In Lewis, cultivated land was valued at an average of $10 per acre, uncultivated at $3 to $8 per acre. In Lincoln, there were 294,213 cultivated acres, assessed at $2,942,136; and 196,142 uncultivated, valued at $631,994. Of the interior counties of the Northwest, Nodaway assessed improved lands at $20, and unimproved at $3 to $10 per acre; Grundy, at $15 per acre; Gentry, next east of the rich county of Platte, and said to be equal to it in fertility and smoothness of surface, with an abundance of water and timber, reported three-fourths of its area unoccupied. There are large amounts of uncultivated land in most of the counties north of the Missouri. Excellent water is reached at a depth of from ten to fifty feet. There is coal in nearly every one of these counties. South of the Missouri, improved lands in Cooper county (underlaid with coal) were assessed at $15 per acre; in Osage county, at an average of $4. Four-fifths of the land in the latter county is unimproved, much of it being hilly and broken. Gasconade

* Report of the State Board of Agriculture for 1879.

reported one-fifth of its surface improved, valued at $10 per acre. There is more or less of lead and iron in all of the counties last named. In the counties along the Kansas border, nearly all containing coal, lead, and potter's clay, improved lands were assessed at from $7 to $15 per acre. From one-half to three-fourths of the area of each county was classed as unimproved, and valued at from $3 to $7 per acre, according to quality of soil and railroad facilities. Every county from Dallas westward, contains much good land, producing from thirteen to twenty bushels of wheat, and from thirty-five to forty bushels of corn, per acre. In the cotton-bearing corner of the State, only one-fourth of Mississippi county is improved, but one-tenth of Pemiscot, and five-eighths of Stoddard. Cultivated lands were assessed at $10 to $12 per acre. Of the mineral-bearing counties on or near the Mississippi, the group comprising Ste. Genevieve, Perry, Madison, and Washington, all contain lead, zinc, and iron; and most, if not all of them, some copper. Madison yields cobalt, and some silver. Lands were assessed at $4 to $13 per acre. Good cotton lands are found in the middle district of the southern tier of counties, along the White river, which is navigable into Taney county. They are valued at $4 to $5 per acre. The several groups of counties I have here described, are so distributed over the State as to enable the reader to form a tolerably accurate conception of the agricultural value of nearly every part of it. The rate at which the new lands of Missouri are being occupied, is indicated by the fact that there were 52,992 acres of public land disposed of in Missouri, in 1879, and over 1,198,000 acres during the ten years ending with 1879.

Before passing to manufactures, I may say, that, according to the Census Bureau's statistics for 1880, Missouri ranks, in hemp production, second; corn, third; tobacco, ninth; wheat, eighth; oats, eighth; rye, eighth. In farm animals: mules, first; oxen and other cattle, second; hogs, third; sheep, seventh; milch cows, seventh; and horses, seventh.

According to the Census of 1880, in the production of iron and steel, Missouri ranked, among all the States, tenth; in lead and zinc production, first; jute and hemp bagging, second; coal, sixth; plate glass, second; green glass, sixth. Of the importance of the lead and zinc production, sufficient has been said already. Several other industries are worthy of especial notice.

The number of establishments engaged in the production of iron and steel was 22, with a capital of $9,152,472; the hands employed numbered 3,139; the wages paid amounted to $734,575; the value of the material consumed was estimated at $3,249,558, and the total product at $4,660,530. Whereas, the weight of iron and steel of all kinds made in this State in 1870 was but 94,890 tons, in 1880 it showed an increase of nearly one-third, amounting to 125,758 tons; of which 95,050 tons—more than three-fourths of the whole—consisted of pig iron and castings direct from the furnace. Of the remainder 16,508 tons were rolled iron, 8,409 tons were Bessemer steel ingots, and there were 4,000 tons of blooms made from the ore. Only 5,100 tons of Bessemer steel rails were produced, as against 201,186 tons of such rails made in Illinois.

Considering that this State is endowed, as I have before shown, with an inexhaustible supply of the very best quality of iron ore, within sight of enormous coal deposits inside its own borders, and convenient to the excellent furnace coal of southern Illinois and the Indiana block coal, it is evident that the development of the iron industry of Missouri is nowhere near what the world might reasonably expect. With the thousands of miles of railroads stretching out from it in all directions to be shod with steel, it is a reflection upon the enterprise of Missouri which nothing can turn aside, that this State makes only one ton of steel rails to every forty tons made by Illinois, which has to import all its iron and fetch furnace coal much farther to its iron and steel factories than Missouri has to do. Certainly a much more rapid development of the iron and steel industry of Missouri should be looked for in the present decade than in the past.

The manufacture of glass, which, in 1880, employed more than 600 hands and produced plate and window glass, glass ware and green glass, valued at $614,277, is here a comparatively new industry. A fine quality of sand is easily procured. The manufacture is in enterprising hands, and it will be pushed with spirit.

There are fully forty manufacturing industries of Missouri, with a product of one million dollars and upwards. First of all among these stands the manufacture of flour and meal, exceeding the sum of $31,000,000 in 1870, and now overrunning $40,000,000 a year. Carpentry and building stood next in 1870,

valued at about $15,000,000. The building improvements in 1880 in nearly all parts of the State, but particularly in and about Kansas City and in the rapidly growing southwest, exceeded those of 1870, yet it is safe to assert that pork and beef packed, and meat cured or canned in 1880, ranked next in value to the flouring and grist mill products. Next in importance stood manufactured tobacco, distilled, malt and vinous liquors, men's and women's clothing, lumber, printing and publishing, saddles and harness, bagging, freight, passenger and street cars, machinery, iron and steel, boots and shoes, furniture, refined sugar and molasses, animal and vegetable oils, bakery products, and brick, ranging in value from $15,000,000 down to about $4,000,000 a year. Below these stand jewelry, tin, copper and sheet iron ware, sash, doors and blinds, blacksmithing, cooperage, patent medicines, paper, brooms, pig, pipe, bar and sheet lead, agricultural inplements, and confectionery, ranging in value from $3,700,000 down to $1,500,000. While St. Louis aspires to be, and has reason to hope to be, the greatest cotton exchange in the country, it is remarkable that the State stands but twenty-second in the manufacture of cotton, having in the last census year only 341 looms and 19,312 spindles, employing but 515 hands.

It only remains for me, in this place, to give a general idea of the principal manufacturing localities. Flour and meal are made in all but three counties, but about half of the enormous total is made in St. Louis county alone. Jackson county, including Kansas City, is the next greatest producer, and St. Charles and Pike counties, on the Mississippi above St. Louis, rank next. St. Louis, Jackson and Buchanan counties (the latter containing St. Joseph) are the chief meat packing districts. St. Louis, St. Charles and Jackson counties lead all others in hemp and paper bagging. Washington, Jefferson, St. Francois and Franklin counties, clustered on the eastern border, and Newton and Jasper counties in the southwestern angle of the State, are conspicuous for lead and zinc smelting, and St. Louis, Marion and Lewis counties for lumber. St. Louis and Kansas City manufacture about three-fourths of all the cigars, snuff and chewing tobacco, furniture, iron and steel, machinery, distilled, malt and vinous liquors, boots and shoes, and clothing. Of all the other chief manufactures named in this chapter, St. Louis makes from fifty to ninety per cent. of the whole.

So long as rivers constituted the main channels of domestic and inter-State commerce, the remarkable fluvial system of Missouri, joined with her position near the geographical centre of the Mississippi basin, gave her peculiar commercial advantages; and seemed to afford to St. Louis, so grandly located between the union of the Missouri and the Illinois with the Mississippi on the north, and the mouth of the Ohio on the south, a positive guarantee of forever remaining the metropolis of the West. For nearly three-quarters of a century, not only the fur trade, but the general commerce of the upper rivers and of the farther West, centered upon St. Louis. The batteau of the fur trader, the keel boat, the barge, the flat-boat, and the raft, all came with the currents, or were laboriously propelled against them by oar and pole and shifting sail. Fifty years from "the founding of the city," the steamboat made its advent upon Western waters. The influence upon the development of the country and the growth of St. Louis was wonderful. Not until the opening of the Erie Canal, in 1825—that magnificent artificial highway between the Great Lakes and the Atlantic, over which, within the period ending Dec. 31, 1872, passed merchandise to the enormous amount of $6,065,060,698 in value—was it deemed possible that Illinois might sometime rival Missouri in the advantages of navigation. Later, the railways came into competition with all other means of transportation, and have served to depreciate, relatively, the commercial importance of Missouri's superior river system. This is still, however, an element of commercial power of large significance. In the year ending June 30, 1879, the number of vessels registered, enrolled, and licensed in Missouri, numbered 395, of 148,692.68 tons burthen; and the total number of sailing vessels, steam vessels, canal boats, and barges on the Western rivers was 2,576, of 501,808.82 tons burthen, against 3,087 vessels, of 597,376.84 tons, on the Northern lakes. The same year there were ten new river steamers built at St. Louis, of 977 tons burthen, and thirteen barges, of 2,479 tons burthen.

The first locomotive west of the Mississippi reached St. Louis in 1852, but little progress was made in railway building until twenty-five years ago. In 1865, when Ohio had 3,331 miles of road and Illinois had 3,157, Missouri had but 941. Since then the increase of mileage has been rapid, reaching a total of 4,053.63 miles in 1880,* including 482.28 of side track. The rolling

* Poor's Manual for 1880.

stock comprised 516 engines, 316 passenger and baggage, express and mail cars, and 11,148 freight cars. The capital stock invested, and funded and floating debts, amounted to $208,989,807; the cost and equipments, to $189,977,013; the gross earnings, to $19,101,987; the net earnings, to $8,411,896; and the interest paid on bonds, to $6,284,545. There are now forty-two roads in the State, of which the greater number centre at St. Louis, connecting there with nearly all the great trunk lines to the north, to the Atlantic, and to the Gulf. Kansas City, on the western border, is another railway centre of rapidly increasing importance, where many of the principal roads from St. Louis and Chicago make connections with the roads of the West and Southwest. Of the forty-two railroads in operation in Missouri in 1879, seven carried 3,514,014 passengers, and 5,525,277 tons of freight.

In 1873, there were thirty-five National banks, with a capital of $9,135,300, and a circulation of $5,918,379. During the sixteen years ending in 1879, since the National bank system was founded, five banks have failed whose capital was $3,250,000. These have already paid about sixty-six per cent. on the claims against them, with a probability of paying twenty per cent. more—a record worthy of remark in contrasting the bank securities and bank management of the past decade with that of broken banks in other days. It is also worthy of remark, that, next to Minnesota, Missouri stands highest in the percentage paid by its insolvent National banks.

The total assessed value of property, according to the Tenth Census, is $529,403,781, of which $381,768,822 was estimated as real estate, and $147,634,959 personal property. The true value of property is not far from $1,000,000,000. The bonded debt of the counties is $11,849,493; and the floating debt, $274,910; of the cities and towns of less than 7,500 population, $1,431,059; and the floating debt, $206,864; the school district debt aggregates $718,784; and, as shown in the table further along, the total debts of cities of over 7,500 was $27,661,867—making a total local indebtedness of $42,142,987. Added to this is the State debt proper, amounting to the sum of $16,758,000. The general county tax amounted, in 1880, to $3,533,089; the general State tax, $1,852,914; the State school tax, $264,693; the school district tax, $1,358,140; the general tax of cities and towns under 7,500, to $321,713; and the taxation of cities, to $4,962,262.

Below I give the total bonded debt of the cities of Missouri with a population of 7,500 and upwards:

Hannibal	$ 167,100	St. Louis	$22,507,000
Kansas City	1,387,949	Sedalia	272,900
St. Charles	32,000		
St. Joseph	1,861,600	Total	$26,178,449

Following are the amounts of total bonded debt issued for the purposes named:

Bridges	$ 961,000	Refunding old debt	$6,437,000
Fire department	100,000	Schools	80,000
Funding floating debt	3,167,200	Sewers	1,287,550
Improvement of harbors, rivers, wharves, canals & water power	874,000	Streets	202,499
Parks and public places	2,326,000	Unspecified*	1,465,000
Public buildings	1,190,000	Water works	5,678,000
Railroad aid	2,470,200	Total	$26,178,449

Of the $5,678,000 bonds issued for water-works, St. Louis issued $5,429,000; and Sedalia, $249,000. St. Louis issued $136,000 for sanitary purposes. St. Joseph issued $1,031,300, and St. Louis $950,000, for railroad aid.

I show in the next table the several dates of issue and the dates of maturity of the above bonds:

Amounts Issued in Years Named.		Amounts Maturing in Years Named.	
Previous to 1860	$1,365,800	Overdue	$ 222,700
1860	92,300	1880	676,666
1861	.....	1881	433,333
1862	.....	1882	346,500
1863	.....	1883	170,000
1864	9,000	1884	29,000
1865	702,000	1885	702,000
1866	799,250	1886	571,350
1867	4,677,750	1887	4,531,750
1868	2,921,350	1888	2,405,150
1869	1,278,250	1889	1,264,950
1870	586,066	1890	575,000
1871	1,488,333	1891	1,170,000
1872	2,468,000	1892	2,311,000
1873	1,774,000	1893	1,878,800
1874	3,178,000	1894	2,178,000
1875	3,399,500	1895	1,544,500
1876	263,800	1896	263,800
1877	110,000	1897	308,000
1878	882,000	1898	1,228,000
1879	675,000	1899	675,000
1880	508,000	1900	508,000
		After 1900	2,190,000
Total	$26,178,449	Total	$26,178,449

* This is a part of the debt of St. Louis; $136,000 of it was created for sanitary purposes; and the rest, $1,329,000, for general purposes.

These bonds may be classified as below, showing amounts drawing the rates of interest named:

10 per cent	$ 1,267,225	5 per cent	$773,800
8 "	927,224		
7 "	2,546,500	Total	$26,178,449
6 "	20,663,700		

The next table shows the rate of increase of the cities and towns of Missouri with a population of 7,500 and upwards, for the last three decades, compares the total assessed valuation of real and personal property with the estimated true valuation, and gives the total bonded and floating debt:

Cities.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Total Ass'd Value of Real Estate and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of Real and Personal Property.	Taxation. Total Levy	Total Debt.
Hannibal	6,505	10,125	11,074	$ 2,900,460	$ 2,904,925	$ 3,739,046	$ 82,607	$ 190,173
Kansas City	4,418	32,260	55,813	10,977,200	11,743,600	15,698,361	491,365	1,300,497
St. Charles	3,259	5,570	9,417	1,744,071	3,580,200	4,707,070	96,539	92,000
St. Joseph	8,932	19,565	32,434	3,598,529	7,907,514	10,668,358	171,970	2,445,600
St. Louis	160,773	310,864	350,522	160,624,840	181,099,972	241,466,630	4,126,859	23,251,897
Sedalia	.....	4,560	9,561	1,898,345	2,251,666	3,105,888	66,033	272,900
Totals	183,887	382,944	467,871	$186,243,105	$209,507,437	$279,343,247	$4,963,933	$27,661,867

Nearly nine-tenths of the population are of American birth. The Irish constitute about two per cent. along both sides of the Missouri river, within a strip from Hannibal west to the Missouri, and along the Mississippi below St. Louis. The Germans are about two per cent. of the entire population. Of these, about two per cent. are found along the southern edge of the State, some twenty per cent. of them in and about St. Louis, and south of the Missouri to the Gasconade. The remainder are quite evenly distributed through the rest of the country. Very few of the Germans became slave-holders, and their communities near the Gasconade contain but few negroes. Canadians, English, and Welsh are scattered in small numbers between the Mississippi and the Chariton, and in and about St. Louis. Swedes and Norwegians seem to prefer the States and Territories farther north and west: what few there are in Missouri are found not far from the Kansas border. The number of dwellings is large in proportion to the population. There being such an abundance of timber, log houses are numerous. Clay for brick, and fuel for burning, are readily obtained nearly everywhere, and brick buildings are very common, both in city and open country.

The Methodist Episcopal church, including the church South, provides one-fourth of the whole church accommodation of the State. The Baptists furnish nearly as much; the Presbyterians about one-eighth; the Catholics nearly the same; and all others the remaining fourth. Taken together, the church accommodations are less in proportion than in States east of the Mississippi, but rather more than in Iowa or Minnesota.

Ten years ago, in the rough country southeast of the Osage valley, from twenty to forty per cent. of the white population over ten years of age could not read or write, and in the rest of the State, the rate was from twelve to twenty per cent. Besides the illiterates among the whites, there was a large body of them in the colored population, and particularly among the late slaves—much the largest proportion of whom were held in the fertile counties along the river valleys. They constituted an element of the population not found in the other States of the Northwest. Undoubtedly these two social evils, slavery and ignorance, handicapped Missouri in the race of progress; and are mainly, if not entirely, responsible for the fact that so large a proportion of the most intelligent, enterprising emigrants from the Eastern States and Europe long avoided this State, and settled in the Territories north and beyond it, on lands no more fertile; indeed, in many sections, quite inferior in soil, climate, and relation to commerce. The rapidity with which Missouri has advanced since 1870, evinces the sound political economy of emancipation and the greater attention now paid to public education. The colored race is rapidly rising in the scale of intelligence, and acquiring the faculty of self-government. The Tenth Census shows a great reduction in the measure of illiteracy.

Missouri has had as wise school laws as her neighbors from an early day; and in some localities the public schools have been excellent. St. Louis had a good system before the free school system was established in Illinois. But there are localities where the law has always been in advance of public sentiment and has proved but little better than a dead letter until very recently, since the new impetus given to popular education. There are now six normal schools in the State, including the one in St. Louis, all doing good work. Two teachers' institutes are required annually in every county. According to State Superintendent Shannon's report for 1880, there are 8,240 school

houses in Missouri, besides 298 houses rented for school purposes. The school property was valued at $7,353,401; and of this, $113,287 had been added in buildings erected within the year. The total receipts for school purposes from all sources, amounted to $4,020,860, and the total expenditures to $3,151,178. Out of a total school population (six to twenty years inclusive) of 681,995 white, and 41,480 colored children, sixty-four per cent. of the former and fifty-five per cent. of the latter were enrolled in the public schools under instruction of 11,659 teachers. The significance of these figures becomes more distinct when we compare a few of them with the corresponding statistics of 1878. Then the amount expended for public schools was $2,406,133 for the entire year, against $3,151,178.47 this year: then the school houses, including rented buildings, amounted to 8,255; now, to 8,547: then all the children enrolled, numbered 428,975; now, 460,090: then the colored children in attendance on the public schools numbered only 4,704; now, 22,896, or nearly five times as many. The school funds reach the grand aggregate of nine million dollars—the township school funds amounting to $1,950,732.89; the county funds, to $2,392,723.67; the special school funds, to $1,523,903.19; the State school fund, $2,909,457.11; and the seminary fund, $122,000. A State University is a part of the State educational system, including an Agricultural College and School of Mines. On the 1st of November, 491 students were in attendance at the University, 513 at the Normal School at Kirksville, 237 at Warrensburg, 184 at Cape Girardeau, 105 at the Lincoln Institute, and 71 at the School of Mines. The deaf and dumb and the blind have special State schools; and there are one or two sustained by denominational benevolence. Added to all the public institutions named are a very large number of what might be called secondary schools—neither primary nor collegiate—controlled by various denominations in the larger towns and cities, under the names of academies and seminaries. Gov. Chittenden says there are more than one hundred of these. The Roman Catholics have a large number of such schools in St. Louis. Of collegiate institutions, the Methodists have three; the Christians, two; the Catholics, four; the Congregationalists, one; the several Presbyterian denominations, three; the Protestant Episcopal, one; the Baptists, one; and one is non-sectarian.

The press of St. Louis has been a potent force in shaping the destinies of that State, particularly during the past thirty years. It has improved greatly during the past fifteen years. Kansas City and St. Joseph have several strong public organs. The total number of newspapers in 1880, was 471; of which forty-two were dailies, publishing annually 37,791,460 copies, besides their weekly or other editions issuing 14,660,696 copies more.

Missouri, in nearly everything that constitutes or concerns a State, is a peculiar subject for study. Her rich natural resources are remarkably diverse. Still more diverse were the elements which have entered into her social, political, industrial and commercial existence. Nowhere else within the West—perhaps nowhere else within the United States—can the social scientist and the political economist find the effects of race and class differences, political organizations, border disputes, and outside prejudices, so plainly recorded in the history of a State.

Missouri presents an exhibition of the energy and the transformations of the present era; working in the midst of, and contending with, race prejudices, political animosities, and the most pertinacious old-time worshiping conservatism. On one side of the same highway, she shows us farmers in their home-spun and home-dyed garments, driving ox-teams, and plowing with the old-fashioned wooden mould-board plows; and, on the other, the thrifty man of our own times, equipped with implements of the latest and best manufacture. In one place, she presents us the humble French peasantry, content in the abundance of food and clothing, and in the good will of neighborly associations gathered around the village church. In the next village all is astir with the spirit of modern times. In early days, when, with the exception of the trading stations at Green Bay, Mackinaw, and Detroit, all the other States that now surround her lay asleep in the savage wilderness, the Indian traffic, her fertile soil, and her mines attracted fearless adventurers, shrewd traders, and hardy laborers. A little later, and her forests, alive with game, and her prairies, overrun with antelopes, deer, and buffalo, drew such spirits as consorted with Daniel Boone, the typical frontiersman, who, when the settlers of Kentucky had frightened the game from the neighborhood of his cabin, quickly emigrated to Missouri, where game was still abundant, and the domain was not parceled off by land titles. Here flocked the poor men of the South, crowded out

by slave labor, yet, in hopes of becoming plantation owners themselves, choosing to extend the domain of slavery. Tempted by the rich bottom lands of the river borders, wealthy Southern proprietors sold their estates, transferred their mules, their negroes, and their plantation customs to the new Territory. St. Louis gathered upon her levee the most heterogeneous elements that ever entered into the composition of a pioneer trading mart. The keen, vivacious Frenchman; the plodding, sagacious German; that strange mingling of passion and languor, cupidity and extravagance, the Spaniard—all joined or contended with the best and worst representatives, civil and military, of native Americanism out of the South and out of the North, to build up a great commercial metropolis—a centre from which, for many years, radiated the operations of the government for all the vast region beyond the Mississippi. It was from St. Louis that Lewis and Clarke set out in 1804, under direction of the government, on the exploring expedition which confirmed our disputed claim to the Upper Missouri and Oregon. It was at St. Louis that John Jacob Astor maintained his Western fur station. It was between St. Louis and Santa Fé that, for many years, the Mexican caravans toiled to and fro across the great plains, freighted with Mexican, Indian, and American goods, and silver and gold.

Then opened the era of railroads and telegraphs. The first locomotive west of the Mississippi was set to running, on the Missouri Pacific Railroad, in 1852; new energies appeared; and a stronger infusion of Northern capital and enterprise mingled with the activities of the city. The types of the various classes which have made Missouri what she is, can be seen within her borders to-day; but surely, although in some places slowly, the strongest lines of difference are fading, and in most localities the elements are being rapidly fused together in the crucible of common interest. The late war, with all its losses and hardships, was one of the most powerful agencies to break up the old refractory elements of the State. Everybody was roused to action on a broader arena; and, when the strife was over, men could not shrink to what they had been. Just enough of the contracted ideas of former times, like fossils in polished encrinital marble, still peep out of some of the narrow streets inherited from the old village of St. Louis, to remind the million passengers over the great bridge, and the stirring

throng, of what the modern city, with its telephonic messages and its world-girding telegraphs, has outgrown. Free Missouri has a new history. Land grants have aided in the construction of a railroad across her northern prairies; of another from St. Louis to the southwest corner of the State; of yet another crossing Southeast Missouri, as part of a system uniting St. Louis, Chicago, Little Rock, and New Orleans. There has been a tremendous putting forth of energy, independent of these aids. With the advance of railroads, emigration filed into the vacant lands of the northern border, renewing and revivifying the stagnant life of old settlements, and, pouring into Southwestern Missouri, has turned it into fruitful farms, heavy orchards, and thriving cities. Indeed, three of the fourteen cities of over 5,000 inhabitants are in this angle of the State. Great trunk lines project from St. Louis down the Mississippi to her mines, and stretch southward for the sugar and cotton of Arkansas, Tennessee, and the Gulf States. Others have pushed out into the Indian nation for the beef and cotton of Texas; others to the western border, where they wage eager competition at Kansas City with the great trunk lines that come down through Iowa. Other new lines stretch into the utmost north, and are reaching far into the Northwest. The roads of higher latitudes come to a focus in Western Iowa; those of the lower centre in Kansas City—the western emporium of Missouri, which is growing with great rapidity. With this putting forth of the energies of a new and vigorous existence, and its legitimate fruits—a greater development of its mines, agriculture enlarged, manufactures expanded, education quickened, and religion, roused as by a new inspiration, increasing its efforts to enlighten and elevate society—Missouri looks into the future, radiant with the hope of yet realizing the great expectations of her early history.

CHAPTER XII.

STATE OF KANSAS.

KANSAS is coterminous on the east, north, and west, respectively, with Missouri, Nebraska, and Colorado, and on the south with the Indian Territory. The original west line of Missouri was the meridian of the confluence of the Kansas and Missouri rivers. Had this been maintained, Kansas would be a regular rectangle, bounded by the parallels of 37° and 40° north latitude, and the meridians of 94½° and 102° west longitude. But the subsequent grant to Missouri of the 3,168 square miles between her old line and the Missouri river makes a small, irregular notch of this extent in the northeastern corner of the younger State. The total area, as determined by the Tenth Census, is 82,080 square miles, or 52,531,200 acres;* that is, almost exactly twice the area of Ohio, and more than fifteen per cent. greater than all New England. Minnesota is situated in the centre of North America; but the centre of the Union is in Kansas.

The general topography of the State is that of an elevated plain, sloping gradually from the northwest and west towards the east and south—the general direction of all the principal rivers. The highest land is in the extreme northwest county, Cheyenne, some 4,000 feet above tide level. At Monotony, some eighty miles farther south, near the Colorado line, the elevation is 3,792 feet; and at Syracuse, on the Atchison, Topeka & Santa Fé Railroad, sixty miles still farther south, it is 3,247 feet. Along the Missouri line, it is from 650 to 1,200 feet. The average elevation of the State, as determined by calculations based on the list of elevations published by Mr. Henry Gannett, of Hayden's U. S. Geological Survey, is 2,375 feet; or about four times the average elevation of Illinois. So gradual is the descent from the higher portions of this elevated plateau to the southern and eastern limits of the State, that, according to the

* The report of the Commissioners of the General Land Office says 80,891 square miles.

report of the State Board of Agriculture, the average fall of the Arkansas river is only six feet to the mile, that of the Smoky Hill, running almost due east centrally through the State, is seven feet, and that of the Solomon is about ten feet. There is no rapid or waterfall on any of the rivers exceeding seven feet. There are no mountains. The general surface is that of a gently rolling prairie, with few abrupt elevations, or deep, rugged ravines or canons; so that, even in the unsettled parts of the country, the emigrant finds his way over the grassy plains and swelling knolls and ridges, with little difficulty. There is very little wet or swampy ground anywhere, even along the rivers; and it is officially stated by Professor Mudge, the State geologist, that there is not a peat bed of fifty acres in extent in any part of the State.

Much the greater portion of the luxuriant pastures and wheat-goldened acres of Kansas are ribboned with beautiful creeks and rivers. The Republican, rising in Colorado, crosses the northwest county into Nebraska; runs eastward, keeping in the southern line of counties of that State for nearly two hundred miles, draining the borders of both States; and finally, turning abruptly to the southward, re-enters Kansas in the northwest corner of Jewell county. More than a hundred miles further to the southeast, at Junction City, it unites with the Smoky Hill river to form the Kansas, a broad, beautiful, though shallow sheet of water, which pursues an almost due east course thence to the Missouri river at Kansas City, about 120 miles away. The Smoky Hill river comes out of the extreme western border, flowing eastward centrally through the State, receiving out of the region between it and the Nebraska line two very considerable streams, the Saline and the Solomon, and collecting tribute from at least fifty smaller branches. Sixty miles or more south of the Smoky Hill, the broad-breasted Arkansas enters Kansas from Colorado; flows gently southward for more than 120 miles; then to the northwest for nearly seventy-five miles, to Great Bend; thence to the southeast for almost 150 miles, through the best winter wheat region, to where it crosses into Indian Territory, still hundreds of miles away from where it empties into the Mississippi. The Cimarron, and a multitude of minor feeders of the Arkansas, drain all the southern tier of counties west and east of this main stream, which receives at last, out of Southeastern Kansas, the fair Neosho, winding

through nearly two hundred miles of its most fruitful counties.

The geology of Kansas exhibits no violent uplifts, no signs of igneous action. Professor B. F. Mudge thinks that the uplifting of this State and the adjoining country from beneath the ocean must have been slow, uniform, and in a vertical direction, leaving the strata almost horizontal. Beginning at the northwestern or highest angle of the State, and descending to the southwestern or lowest angle, one first travels over a considerable area covered to the depth of 100 or 150 feet with alluvium and loose drift of the Post-Tertiary age, underlaid by sandstone of the Pliocene formation from 1,200 to 1,500 feet in depth; then, for about seventy-five miles, over Cretaceous rock, the soft Niobrara and Fort Benton limestone and shale, and the Dakota sandstone (the first 200 feet, the next 260, and the last some 500 feet in depth); then the limestone and shale of the Upper Carboniferous formations, 2,000 feet in depth; and finally the Coal Measures and the Sub-Carboniferous rocks, the former about 600 feet, and the latter 150 feet, thick. Alluvial deposits, from five to fifty feet in thickness, cover nearly all the river valleys and the depressions between the higher swellings of the prairies; particularly the abandoned beds of rivers, such as cover large surfaces in some parts of the country. Along the banks of the Missouri, extending back into the prairies from 50 to 100 miles before it finally disappears, the Bluff, or Loess, formation (common to the Missouri river on both sides far up into the Iowa, Nebraska, and Dakota countries) covers the land to a depth of from 100 to 125 feet. Professor S. Aughey, of the University of Nebraska, has analyzed the sediment of the Missouri, and shown conclusively that it is of the same nature as the silt of this swift and muddy stream, consisting of fine sand and lime, with clay, and very little coarse material; indicating that these bluffs were deposited at a time when the waters of this mighty river flowed on a higher level, and spread like a broad inland lake over leagues of land on either side of the channel it has worn out for itself. The fossil remains of the mastodon giganteus, the elephas Americanus, a species of horse, and various smaller mammals, abound in some parts of this formation. The drift—consisting of quartzose bowlders, greenstone, granite and syenite (the last two comparatively rare), pebbles, and gravel—is scattered over most of the region north of the Kansas river, nearly to the Republican, but extends very little, if any,

to the westward, beyond that stream. The Cretaceous formation, consisting of what are called the Niobrara, Benton, and Dakota rocks, covers an area of about 40,000 square miles. If we had space, there is much of interest in these rocks to describe. They abound in fossils. The fossil floræ, especially, are peculiarly novel and interesting, and have led geologists to modify some of their previous theories in regard to the geology of the West. Here are those singular concretions, which never fail to attract the attention of tourists—"Pulpit Rock," "Rock City," "Table Rock," and other mural oddities, so often depicted in the descriptions of travel on the Western plains. The Coal Measures cover an area of about 9,000 square miles, underlying the greater part of seventeen counties, in every one of which coal exists in greater or less quantities. It is estimated, however, that not more than half of this area—possibly not more than one-third—will afford profitable veins. The geological exploration of the Kansas Coal Measures is still far from complete; and this estimate may prove too low. There are three principal seams now being worked, and two of them profitably: the Osage, the Cherokee, and the Fort Scott seams. The first lies in Osage county, mainly, extending into Franklin, being in all about fifteen miles broad, and thirty long, and from fifteen to thirty inches in thickness. It is mined at the surface where it outcrops, and also in shafts from twenty to thirty feet deep. This is a good gas coal, and cokes well. The Fort Scott seam appears at or near the surface in many places, but has been so imperfectly explored that it is impossible, as yet, to estimate its extent or value. The thickest, and, all things considered, the best, bed of coal in Kansas, is that found in Cherokee, Crawford, and Labette counties. It enters the State from the Indian Territory, near Chetopa, runs across the southeast part of Labette county, the west and north part of Cherokee, and the southeast part of Crawford, into Missouri. The thickness of the coal is from fifteen to fifty-four inches. It cokes well, and is a good gas producer. It is used at the Joplin mines for smelting; and it is said by some to be as good as, or better than, the Indiana block coal, for reducing the obdurate zinc ores. It is used for this purpose at the zinc furnaces in this neighborhood. A partial idea may be obtained of the product of most of these mines from the number of cars of coal shipped from various points. In 1877, there were 9,022 car loads sent out from stations on the Mis-

souri river, Fort Scott & Gulf Railroad; and, from stations on the Leavenworth, Lawrence & Galveston Railroad, the shipments were 590 car loads. The best coal mined at Leavenworth is obtained by sinking shafts some 700 feet through the Upper Carboniferous rocks, into the lower formation. Seams of coal of inferior quality, seldom more than twelve inches thick, are found in Leavenworth county, in the Upper Carboniferous rocks; and similar seams are worked in Jackson, Atchison, Doniphan, Brown, and Jefferson counties. The product of the Leavenworth mines of all kinds, amounted to 534,000 bushels in 1871, and had risen to 1,500,000 bushels in 1878. Wells of burning gas have been discovered in various parts of the State, when boring for coal or petroleum. Some of these are yielding a steady outflow, sufficient to illuminate towns of from 5,000 to 30,000 inhabitants, or capable of running furnaces and engines. Lead and zinc are found in several of the southwestern counties; but, although many shafts have been sunk, mining has not proved profitable, except at what are known as the Short Creek diggings, covering an area of less than twenty square miles on the east side of Spring Creek, near the mouth of Short Creek, which flows into it from Missouri. There are two zinc furnaces, one at New Pittsburg, in Crawford county, and one near Cherokee, both located over rich coal mines. The zinc is brought to these furnaces from the mines above referred to, and a few other places. From 11,000 to 12,000 pounds of spelter are usually obtained from twelve tons of mineral. In the Missouri-Kansas lead and zinc region, as in the Dubuque and Galena districts, these ores are found closely associated in the Keokuk limestone of the Sub-Carboniferous formation. The mineral is found, not in the limestone itself, but in interposing strata, or irregular masses of chert. This lead ore is mainly of the galena, or sulphuret of lead, variety. The lead and zinc mines of the Short Creek, and adjoining mineral district of Newton and Jasper counties, Missouri, are among the most prolific, the most economically exploited and easily worked, mines of these ores in the United States. The lead districts of Colorado, and the vast mineral regions west and south of that, are of course broader and richer, but are too far removed from coal to be economically reduced. Only as the lead is associated with the precious metals, is it likely to be transported; as the base bullion of Leadville and other far-Western mines is now brought

to Omaha, Chicago, and St. Louis, in large quantities, to be desilverized. The production of lead in the United States in 1878, expressed in tons, was as follows:

Utah (desilverized)	19,310
Nevada (desilverized)	27,735
California (desilverized)	3,857
Montana, Colorado, etc. (desilverized)	6,500
Total (desilverized)	57,402
Missouri-Kansas	14,318
Galena	4,011
Hard Missouri	9,391
Total United States product	85,122

In 1879, a careful estimate showed that nearly, if not quite, three-fourths of all the Missouri-Kansas lead product came from the Short Creek, Kansas, mines. From the discovery of these rich deposits in May, 1877, down to Dec. 1, 1879, the total product of this locality was estimated at 36,000,000 lbs. In some instances, as much as 800,000 lbs. of mineral were taken out in a single day. The precious metals have not been found in Kansas in paying quantities, and, from all the geological indications, are never likely to be. Salt springs and salt marshes are numerous in this State; and there is no reason why enough of this article should not be produced to supply all the Missouri valley. Twelve salt springs have been conveyed by Congress to the State, and now constitute a part of the endowment of the State Normal School. The Tuthill salt marsh, in Republic county, covers a thousand acres, much of which is entirely covered with a dazzling white incrustation of salt. Large deposits of crystallized salt exist along the south line of the State, south of the great bend of the Arkansas, some of them from a foot to thirty inches in depth. In various places the people manufacture all the salt they need for home consumption, in common household utensils. Quarries of good building material are common. Limestone occurs in all formations, except the Pliocene and the Dakota; and these contain an abundance of sandstone. The Junction City limestone, common in the Sub-Carboniferous region next east of the Missouri line, can be sawed with an ordinary cross-cut saw, and planed with a carpenter's plane, and is at the same time firm enough for building purposes, hardening with exposure. Gypsum exists in the upper valleys of the Saline and Smoky Hill rivers. Some of these formations cover from one hundred to two hundred

square miles, in layers two to fifteen or twenty feet in thickness. Near the confluence of the Little Blue with Big Blue river, is a gypsum bed of several square miles in area, and from three to ten feet thick. Here it is manufactured in considerable quantities. Quick-lime, of good quality, is made from almost any of the limestone rocks of the State; and hydraulic cement, of fine quality, is manufactured on a large scale, at Fort Scott. Hydraulic limestone exists also at Leavenworth, Lawrence, and other places.

The bottom lands of Kansas, varying in the different counties from five to twenty-three per cent. of the entire acreage, are covered with a rich alluvial soil, from four to ten, and even, in some places, twenty feet deep. On the benches of the rivers (the abandoned portions of their ancient channels), the loam, varying from two to seven feet in depth, is of much the same character, affected somewhat more by the native soil of the uplands, or high prairies, which are overlaid with a fine black or chocolate-colored loam, from one to three feet thick. This latter soil varies with the nature of the underlying rocks. Most of the limestones which underlie a large proportion of this region are so soft and so fine grained that they will easily yield their ingredients to the disintegrating forces of nature to enrich the loam above them. The extreme fineness of these ingredients has much to do with the remarkable richness of the soil all over the greater part of the State. The parts excepted lie over the Pliocene sandstone, and in the saline districts, embracing the most elevated counties of the extreme northwest, and those drained by the Cimarron, in the southwest. These parts certainly appear to be less highly favored as regards soil and climate, and are more subject to the grasshopper plague than the rest of Kansas. For the present, at least, they seem to be adapted for little besides herding cattle and pasturing flocks. The popular notion, however, that the lands lying near the Colorado line are quite generally covered with alkaline deposits, I am assured, on the testimony of the State geologist, is erroneous. He declares, that, during fifteen years' acquaintance with that portion of Kansas, he has discovered but two alkaline springs, and has never seen ten acres of land in one place where the vegetation has been injured by it.

The native woodlands of Kansas originally covered less than five per cent. of its entire surface. The forests, if there is any-

thing answering to this name in the entire State, are in the eastern counties, the timber belts growing narrower and lighter towards the west, where trees appear only along the borders of the streams, in fringes from a mile and a half to less than half a mile wide. In some counties the State Agricultural Report estimates the timber area at less than one per cent. of the whole. The principal native trees are black walnut, hickory, oaks of several varieties, cottonwood, sycamore, elm, hard and soft maple, ash, mulberry, hackberry, willow, and pecan. Timber culture has been encouraged by State enactments, as well as by timber culture acts of Congress. At first, tree planting was attended with but little success; but, with experience, better results have followed, and there are now many counties dotted over with miniature forests of from one to thirty acres on a farm. The Farmers' Institute of the State Agricultural College has published a list of twenty four varieties of trees suited to the climate of different portions of the State. As prairie fires become less frequent, and the hygrometric condition of the country improves with the advance of cultivation, the wooded fringes of the water-courses extend by self-planting. Dr. L. Stenberg says: "On many of the small streams, there is a more dense growth of timber than when the country was first opened to settlement. The necks of creeks, formed by their numerous windings (having a narrow lining of timber) are being gradually covered with trees; and the shading and mulching afforded by these trees produce congenial conditions, under which numerous others are constantly springing up."

The buffalo, or American bison, still pastures in Western Kansas; and occasionally a herd of wild horses dashes into the southwestern counties. Antelopes and deer bound along the picturesque bluffs and hide in the tall grass and woody selvedges of the bottom lands. In the more densely wooded portions of Eastern Kansas the wild-cat and the lynx are found. Bears are sometimes seen. Wolves, although not so numerous as formerly, are far too common for the welfare of the sheep raisers. Villages of prairie dogs divert the traveler in the western counties; although these are now extremely rare. The mink, the fox, squirrels and rabbits, are numerous in some localities; and field rodents of various species abound. The State permits counties to offer a bounty of $1 each for the scalps of wolves, coyotes, wild-cats, and foxes, and five cents for each rabbit

scalp. Under this law, $1,036 was paid for wolf scalps, $485 for coyotes, $356 for wild-cats, $51 for foxes, and no less than $21,468.90 for rabbits, in twenty-seven eastern counties, during the year 1877–78. Flocks of pigeons are seen rarely on the plains; but great bevies of grouse feed in the grain and stubble fields. The plover, snipe, and quail are easily found in the eastern counties. The predatory birds common to Missouri and Southern Iowa are all common to most parts of Kansas. The Missouri, Kansas, Neosho, and Arkansas rivers abound in fish. A few of the choicest varieties of the Upper Mississippi are not found here, or are very rarely taken. The principal food fishes are striped bass, white perch, pike of several varieties, bass and sun-fish, eels (sometimes of six pounds' weight), cat-fish (often from 100 to 200 pounds' weight), buffalo fish, and other members of the sucker family, and several kinds of herring. A fish commission has been established by the State, and laws passed, requiring the construction of fish-ways, and regulating the taking of fish, especially during the spawning season. Large quantities of eggs of the California salmon, shad, German carp, and other fish, have been deposited in the Kansas streams.

The climate is liable to greater extremes of heat and cold than that of the States on the same parallels east of it. While the annual mean temperature of all but a very small portion in the central district of Southern Kansas corresponds with that of Kentucky, Southern Ohio, and the most of Missouri south of the Missouri river, ranging from 50° to 60° Fahr., the greatest heat of summer and the greatest cold of winter vary considerably more than in the States named. The average temperature of the hottest week of 1872 in Kansas City, 90°, corresponded with the average temperature for the same period in Central and Northwestern Missouri, Central Illinois, and Eastern Kentucky; but the mean temperature of the coldest week of the ensuing winter, zero, was the same as that of Chicago, Milwaukee, and Northern Michigan,* from three to six degrees farther north. During the spring and autumn, high winds prevail more frequently than in States east of the Missouri. The rainfall, which is usually abundant in the counties along the Missouri line, decreases very materially as we go west. Professor Frank H. Snow, the State Meteorologist, classifies his observations in three tables; one for the "eastern rain belt," extending west to Fort

* Chart of the United States Signal Service, in U. S. Statistical Atlas.

Riley; another for "the middle belt," reaching beyond this to the west line of Ellis county; a third for "the western belt," extending to the Colorado line. The mean rainfall for the twelve months ending Oct. 31, 1877, was 44.49 inches in the eastern belt, 30.04 inches in the middle belt, 25.63 inches in the western belt, and 33.39 inches for the entire State. For the twelve months ending Oct. 31, 1878 (an unusually dry year), the hygrometric markings were 37.58 inches, 27.89, and 21.73, for the several belts above named, taken in the same order. It is maintained by close observers that the rain belt travels westward with the line of settlements. The following figures, taken from Mr. F. B. Hough's Report upon Forestry for 1877, showing the average annual rainfall for a series of years ending with 1874, favors this theory. The average rainfall in the eastern rain belt for the time referred to was 38.03 inches; in the middle belt, 23.61; and, in the western belt, 18.47; showing from 3¼ to 4½ inches less rainfall in the middle and western belts at that time than in the unfavorable season of 1878. and over seven inches less than in 1877.

Not until the vital statistics of the several States for the past decade are compiled and published, can any fair comparison of the salubrity of Kansas be drawn, based upon mortality lists. In 1870, 564 out of every 1,000 deaths were among children ten years of age and under, which was slightly more than in the adjoining States of Missouri and Iowa. The same year the deaths from consumption were from five to nine in every 100 decedents, for all the State except Doniphan county, where they were between nine and fourteen in every hundred decedents. From five to nine in every hundred deaths resulted from intestinal diseases, except in the lower parts of Wyandotte, Worth, and Shawnee counties, and the six counties next south of these, where the mortality from this cause rose to from nine to fourteen in every 100 decedents; and excepting, strangely enough, the next six counties below these, in which the mortality from this cause fell to only two to five in a hundred. The deaths from enteric cerebro-spinal meningitis and typhus diseases, in no part of the State rose to more than from five to nine in a hundred decedents.

Such is the broad domain mapped over the very heart of the American States in a grand plateau of prairie two hundred miles in breadth, four hundred miles in length; with a soil, in

the language of Charles Sumner, "of unsurpassed richness, and a surface of fascinating, undulating beauty; with a health-giving climate, calculated to nurture a powerful and generous people, worthy to be a central pivot of American institutions." Such is Kansas by nature, just as she lay when the orator thus described her in the American Senate, barely twenty-six years ago—when she was, as yet, merely a luxuriant pasture for countless herds of buffalo, and a hunting ground for the wild tribes of the "Great Plains." Such slight conception had the United States government of the great attractions of this portion of its territory, such unconsciousness of its own inherent powers of expansion, that the rulers never dreamed that this region would be wanted for civilized settlements for at least a generation to come; and, even so late as between 1840 and 1850, they removed remnants of Indian tribes from Territories east of the Mississippi into this Territory, and deliberately conveyed to them broad belts of the Kansas prairies, in what is now the most populous portion, "in fee simple forever." In this way came the Kickapoos, the Delawares, the Wyandots, and other tribes. A few whites came with them, as government agents and missionaries, or as traders. It was not until after 1850 that white settlers began to venture into Kansas in any appreciable numbers, to pre-empt lands and make permanent settlements. All of this State east of the 100th meridian was included in the Louisiana purchase. The portion west of that came to the United States by cession from Mexico and Texas. By the "Missouri Compromise" of 1820, it was agreed that all of the territory of the United States north of the parallel of 36° 30′ should be free soil. As settlers began to take possession of this country, among them went a few families from Missouri, taking slaves with them, or claiming the right to do so. They asserted, that the "Compromise Act" of 1850 was virtually a repeal of the Compromise of 1820, as far as Kansas was concerned. In this claim they were encouraged by public sentiment in the slave-holding States, and by the pro-slavery party in the North. On the other hand, the anti-slavery element of the North resolved to resist the extension of slavery by all legitimate means. Emigration aid societies were organized and chartered in Massachusetts and Connecticut; and companies of colonists, supplied with means of self-defense, were sent out as fast as they could be induced to go, with the intention of overwhelming the pro-

slavery settlers at the ballot-box as soon as the new Territory should be organized. A partisan conflict of the most violent character immediately ensued, and was maintained for several years, with the great parties of the nation as lookers-on and abettors. Congress passed the celebrated "Kansas and Nebraska Act," May 30, 1854, practically abrogating all restrictions as to slavery, and providing for the organization of two Territories; that of Kansas to embrace all of the present States of Kansas and Colorado. The new Territory was christened in blood; and strife and blood-shed did not wholly cease until the close of the "War of Secession," which this conflict materially helped to initiate. In spite of every obstacle and discouragement to its growth, Kansas became a State Jan. 29, 1861, with a population of about 110,000. Since then it has grown, as shown in decennial periods by the following table, at a rate remarkable even in the history of the West; closing the nineteenth year of its existence as a State, with a population of nearly a million.

Periods.	Total.	White.	Colored.	Indians.	Ratio of Increase.
1860	107,206	106,390	627	189	.....
1870	364,399	346,377	17,108	914	248
1880	995,966*	952,056	43,096	792	166

By far the largest proportion of the population of Kansas is engaged in agriculture. Of the 52,531,200 acres in the entire State, over 9,000,000 are now under cultivation; the acreage in farm crops having increased during the past two years at the rate of more than a million acres per annum. In 1879, the number of acres planted in Indian corn was 2,718,800†—a gain of 437 per cent. in ten years; while the increase of population, remarkable as it was during the same period, amounted to only about 170 per cent. The same year, the number of acres planted in wheat was 1,644,500, a gain of 973 per cent.; in rye, 111,000, a gain of 1,422 per cent.; in oats, 480,600, a gain of 1,216 per cent.; in barley, 45,000, a gain of 5,415 per cent.; in buckwheat, a decrease of nearly fifty per cent.; in potatoes, 52,300, a gain of 416 per cent.; in hay, 897,844, an increase of 528 per cent.

The following table, compiled from the statistics of the Census

* Of whom 100,705 were foreign born. † Statistics of the Agricultural Bureau.

Bureau, shows the principal cereal crops of Kansas in 1879, and for the two census years next preceding:

Crops.	1880.	1870.	1860.
Wheat	194,173	2,891,198	17,894,141
Rye	3,833	85,207	413,181
Oats	88,325	4,097,925	8,180,385
Indian corn	6,150,727	17,095,595	105,729,325
Buckwheat	41,575	27,826	24,421
Barley	4,716	98,405	300,973
Totals	6,483,349	23,726,086	131,971,726

Occasionally an unfavorable season, like that of 1878, materially reduces the average yield per acre; and this may or may not be partially compensated for by an appreciable rise in price. There is only one way of approximating a correct knowledge of the rewards of farming—particularly in a new country. This is by averaging the yield and the prices of farm products for a series of years, as I have done in the following table, which shows the annual yield and value of the principal farm crops of Kansas, averaged for the five years ending with 1879:

Crops.	Total yield of crops of 1880 in bush's, pounds or tons.	Average annual yield in bushels, pounds or tons for 5 yrs. ending 1879.	Avg. price per bushel, pound or ton for 5 years.	Average annual value of crops for 5 years ending with 1879.	Av'rge annu'l yield p'r acre fr 5 yrs. ending 1879.	Avg. ann'l value per acre for 5 yrs. ending 1879.
Indian corn	24,506,000	85,943,960	$ .22+	$19,602,439	37.5 bu.	$ 8.53
Wheat	2,800,000	17,784,100	.80+	14,043,129	14.4 "	11.56
Rye	20,000	2,886,080	.42	990,585	19.5 "	8.24
Oats	1,500,000	12,480,800	.21	2,611,216	32.7 "	6.87
Barley	25,000	1,499,640	.41	585,148	21.0 "	9.05
Buckwheat	150,000	108,380	.82	88,548	16.5 "	12.98
Potatoes	1,500,000	4,337,800	.52	2,227,824	90.+ "	45.59
Tobacco	.....	522,500	.08.9	49,325	685 lbs.	61.13
Hay	250,000	1,201,680	3.74	4,441,919	1.53 T	5.66
Total	.....	.....	.....	$44,635,033	.....	.....

In addition to the crops above named, the sweet potato crop of 1879 amounted to 197,407 bushels, valued at as many dollars; the yield of sorghum to 2,721,459 gallons, worth $1,224,656; the castor bean crop to 766,143 bushels, worth $1 a bushel; the cotton to 33,589 pounds, worth $3,023; the flax to 622,256 bushels, worth $1 per bushel; the hemp to 557,879 bushels, valued at $33,473; the broom corn to 8,095,145 pounds, valued at $283,330; and farm garden produce valued at $236,311.69.

The total acreage under cultivation in 1879, amounted to 7,769,926.26 acres, a gain of 1,349,514.43 in a single year; yet this was only about one-third of the assessed lands, and about one-fifteenth part of the total land area of the State. Great attention is given to orchard planting. Some of the finest fruit exhibited at the Centennial Exposition at Philadelphia, was from the region designated in certain maps scarcely thirty years old as "The Great American Desert." Sixty-six counties reported 1,530,275 apple trees, 57,829 pear trees, 5,069,579 peach trees, 123,479 plum trees, and 461,237 cherry trees in bearing; and 3,546,200 apple trees, 138,795 pear trees, 3,238,361 peach trees, 195,811 plum trees, and 571,562 cherry trees not in bearing.

The abundance of nutritious native grasses, and the luxuriant growth of tame grasses, together with the mild winters which make it possible for herds and flocks to live upon the range or in the pasture fields with little or no grain or fodder, have peculiarly adapted Kansas for a stock raising State. Accordingly we find that there has been a rapid and steady increase of farm animals; the number of horses in January, 1880, being 299,700—a gain of 138 per cent. in ten years; mules, 57,000—a gain of 1,040 per cent. in the same period; cows, 351,400—a gain of 149 per cent; oxen and other cattle, 647,700—a gain of 203 per cent.; sheep, 371,990—a gain of 210 per cent.; hogs, 1,208,700—a gain of 132 per cent.* On these dry prairies, stock seems to be comparatively exempt from epidemic diseases. Hog cholera appeared in only four counties in 1879. A disease called "black leg" affected the calves to some degree in eleven counties. Texas, or Spanish, fever, affected a few cattle in two counties, where some Texas cattle had been pastured. Severe laws exist against importing diseased cattle; and these are strictly enforced. It may be seriously doubted if the fatal pleuro-pneumonia, so much dreaded by stockmen the world over, and which has led to such rigorous restrictions upon the traffic in live stock in the principal European countries, has ever existed in Kansas. The following table† shows the number of farm animals of Kansas, averaged for the five years ending January, 1880, compared with the number in February, 1870; also the price per head, and the total annual value, averaged for five years:

* Based on the Agricultural Bureau's figures.

† From the Annual Reports of the Agricultural Bureau. All estimates of the number of stock upon the Western cattle ranges are more or less conjectural.

Farm Animals.	Number in February, 1870.	Annual number of animals averaged for five years, ending Jan., 1880.	Price per head averaged for the five years, ending Jan., 1880.	Total annual value averaged for five years.
Horses	125,000	254,700	$49.96	$12,699,482
Mules	5,000	56,260	64.28	2,319,617
Oxen and other cattle	213,300	554,540	18.79	10,337,562
Milch cows	140,700	289,490	23.04	6,715,925
Sheep	120,000	221,460	2.40	518,112
Hogs	516,000	667,140	6.22	3,460,094
Totals		2,023,600		$36,050,792

Dairy farming has not received as much attention as it is destined to command. Eastern Kansas, particularly, is well adapted for this business; and here the product has been rapidly increasing. Cheese factories have been established in a number of counties; and there are instances in which the increase of cheese manufactured has been 300, 400, and even as great as 800, per cent. in three years. The butter produced in the whole State in 1878 amounted to 13,790,374 pounds, and the cheese to 1,005,958 pounds. In 1880 the cheese product had increased about 182 per cent., amounting to 2,836,801; and the butter twenty-four per cent., reaching a total of 17,100,063 pounds. The poultry and eggs sold in 1878 brought over $382,000, and in 1880 more than $450,000. The hives of bees numbered over 21,000 in 1880, producing about 250,000 pounds of honey and wax, worth not less than $68,000. The grand total of farm products in 1880—the crops, the increase of farm animals, the products of live stock, and the products of the market gardens, orchards, and apiaries—aggregated not less than $82,000,000.

It is interesting to unroll the map of Kansas, and, with the official statistics of counties in hand, trace across its rolling prairies and along its fertile valleys the agricultural districts of richest growth. The most prolific winter wheat producing section lies along the Arkansas river, between Great Bend and the line of Indian Territory; directly north of this, along the Kansas, Smoky Hill, and Saline rivers; and on the divide between these. The cluster of twelve contiguous counties—Saline, Dickinson, Marion, McPherson, Rice, Barton, Reno, Harvey, Sedgwick, Butler, Cowley, and Sumner—within this section, produced in 1878 fifty-nine per cent. of the winter wheat harvest of the

entire State. The richest spring wheat district lies directly north of this, beyond the Kansas, on lands watered by the three leading northern tributaries, the Solomon, the Republican, and the Big Blue. In the year last named, the cluster of seven contiguous counties—Smith, Jewell, Republic, Washington, and Marshall, next the Nebraska line; and Mitchell and Cloud, immediately south of these—produced fifty-nine per cent. of all the spring wheat raised in the State. These may be still regarded as the banner winter and spring wheat sections of Kansas. The rolling prairies of Southeastern Kansas, and the prolific wheat-bearing counties on the Republican, Solomon, and Smoky Hill rivers, are flecked with flocks of sheep. Draw a line from Kansas City due southwest to Indian Territory. The twenty-three counties in the southeast angle of the State, cut off by this line, contained, according to State statistics, 96,251 sheep, against 78,633 in a cluster of seventeen counties, embracing the lower reaches of the rivers above named, and the Kansas river, at, and immediately below, their junction with it; and these two districts contained more than seventy-one per cent. of all the sheep in the State. The great herds of cattle and hogs are found in Northeastern Kansas. If we mark off just such a corner in this part of the State as I outlined in the southeastern portion when pointing out the principal fields of sheep husbandry, it appears that there were 280,000 milch cows and other cattle, and 337,000 hogs in the former locality, against 130,000 milch cows and other cattle, and 151,000 hogs in the latter. Where the cattle and hogs are found, there are the great corn fields. Turning again to the two districts pointed out, the northeastern one produced in 1878 nearly twice as much corn as the one in the southeast. But, in fact, there is not a valley in Kansas where corn will not grow luxuriantly; and there is no place within its limits where cattle will not thrive.

The increase in the manufacturing industries of Kansas during the last decade will be a surprise to the most sanguine citizens of that flourishing State. According to the Census report of 1880, there are 2,762 manufacturing establishments, with a capital of $10,183,800; the greatest number of hands employed at any one time during the year was 15,174; the value of the materials consumed was $20,122,327, and the value of the production was $30,489,093. The total amount paid in wages during the year was $3,769,126. Subtracting this, and the value of materials

consumed, from the total product, leaves nearly $6,600,000 for other expenses and net profits.

The above does not include the industries taken by special experts, such as mining, brewing, distilling, silk, cotton, wool, coal, etc.—all of which are treated in the general review. The following table presents the principal statistics of some of the important industries in the State of Kansas:

Business.	No. of Establishments.	Capital, Dolls.	Greatest number of Hands employed at any one time during the year.	Average number of hands employed.			Total Amount Paid in Wages during the year, Dolls.	Materials, Dolls.	Products, Dolls.
				Males above 16 years.	Females above 15 years.	Children and Youth.			
Agricultural implements	16	73,950	115	98	....	1	28,504	25,940	76,565
Brick and tile	106	187,725	1,336	1,009	30	60	157,689	92,717	374,738
Cheese and butter	45	74,815	160	93	26	10	10,322	45,108	78,195
Flour and grist mill products	314	3,998,911	1,923	1,416	5	7	560,508	10,184,560	13,995,550
Lumber, sawed	144	258,925	911	676	6	10	108,219	206,708	636,975
Totals	625	4,592,326	4,444	3,292	57	108	865,302	10,555,041	14,480,003

In 1850 the United States Census makes no mention of the industries of the State of Kansas—the columns are blank. Ten years later, it seems, 1,735 hands were employed; in 1870, this number had increased to 6,844; and in 1880, it had reached 15,174. I have compiled the following statement, which exhibits at a glance the condition of industrial enterprise in 1860, in 1870, and in 1880: it also shows the percentage of growth, of capital, materials used, and value of products manufactured:

Items.	1860.	1870.	Per Cent. Increase over prev. Decade.	1880.	Per Cent. Increase over prev. Decade.
Hands employed	1,735	6,844	.....	15,174	.....
Wages paid	$ 880,346.00	$ 2,377,511.00	.....	$ 3,769,136.00	.....
Per capita wages	507.40	347.39	.....	248.39	.....
Capital	1,094,925.00	4,319,060.00	298+	10,188,800.00	135+
Materials	1,444,975.00	6,112,158.00	323—	20,122,827.00	229+
Products	4,397,408.00	11,775,883.00	173—	30,499,093.00	159—
Net products	2,952,077.00	5,663,159.00	67—	6,597,840.00	95—

In brief, the increase of capital in the first decade was 298 per cent.; in the second, 135 per cent; the increased value of material used, 323 per cent. in the decennial period ending 1870, and 229 per cent. in that ending 1880; the value of the products manufactured increased 173 per cent. in the first, and 159 in the

second; but the net value of the products, after deducting the value of the materials used, and the wages paid, exhibits an increase of sixty-seven per cent. in the ten years ending in 1870, and no less than ninety-five per cent. in the last ten years; an actual gain in the increase of net products of the second over the first decade, of twenty-eight per cent. Well may Kansas be proud of the rapid development of its manufactures.

Undoubtedly the excellent natural roads, broad and unobstructed as the path of the wind across the prairies, have done much to facilitate the settlement of the country. Navigation, except through the Missouri river, has rendered little aid. The long, winding rivers of the interior, often broad, and even majestic looking as they sweep between their picturesque borders of grassy bluffs and valleys waving with wheat and corn, are too shallow for steamboats and heavily laden barges. The railroads have been the principal engineers and carriers in the work of opening Kansas to the world, and leading in the myriads of settlers who have flocked hither from all quarters of the globe. They have not waited for immigrants to develop the country and create business for them; but they have cast up highways before them, and led them into this goodly heritage, filling the world with astonishment at the results, as shown in the increase of the population from 373,299 to 995,966 in the past ten years, and the augmentation of wealth in a still greater ratio. Situated, as this region is, at the most remote distances from all the great commercial and industrial centres of the globe; hidden, as it were, in the inmost bosom of the continent; devoid of any interior river system of transportation—it would have taken ages to develop it as it has been developed within the last twenty years through the instrumentality of the railways, conjoined with the intelligence and energy of its pioneers and their immediate successors. In 1865, Kansas had but forty miles of railroad. The roads of other States and the Missouri river had brought the immigrant to her borders and left him to complete his journey as best he could. Five years later the number of miles of railroad had increased to 1,501. In the next five years, 649 miles were added; but in the last five years, more than twice that increase has been made—or 1,318.50 miles of new road—until now she stands united to all the great trunk lines binding the Atlantic States to the overflowing granaries and swarming stock farms of the West, to the grand artery of

traffic between the Pacific and the Atlantic, to the Gulf and all the intervening wealth of Texas; and, as I write, the Atchison, Topeka & Santa Fe Railroad Company is laying the last rails and driving the last spikes on the iron path that is to open to her Mexico, Arizona, California, and all the tributaries of the Southern Pacific Railroad. The railways operated in whole or in part in this State, enumerated in Poor's Railroad Manual for 1880, were thirty-five, of which only four reported the number of passengers, 584,758, and the tons of freight, 1,621,436, carried during the year 1879. The capital stock of certain roads operating 2,404.22 miles of road in Kansas was $109,775,600; the cost of road and equipments was $107,963,594; the gross earnings amounted to $13,689,929, the net earnings to $6,390,732; the interest paid on bonds was $3,187,562; and the dividends paid on stock were $815,859.

There are ten National banks now in operation in Kansas, with a capital amounting to $900,000, and outstanding circulation on Nov. 1, 1880, aggregating $721,960. Besides these, there were 148 State banks, with $1,564,144, and deposits amounting to $4,877,150.

Real estate is assessed in Kansas once in two years, personal property every year. The law provides that real estate shall be assessed at its true value in money, to be determined from actual value; and the price at auction or forced sale shall not be the criterion of value; personal property, at the usual selling price where it is held. Current money in possession or on deposit is assessed at full value; and depreciated bank stock, at its current value. It is the opinion of the Attorney General of Kansas, that property is not assessed at more than fifty per cent. of its true value. The county clerks and county attorneys (whose opportunities for information on this subject are better than those of any other officers) give the assessed value of property in the different counties at from fifty to seventy-five per cent. of the true value. Railroads and railroad property are assessed by a board of Railroad Assessors, composed of the Lieutenant Governor, the Secretary of State, Auditor of State, State Treasurer, and Attorney General. The assessed valuation is returned to the county clerks and placed on the assessment roll, subject to the same per cent. of levy as other property. The Auditor of State says the assessed value of railroad property is estimated at fifty per cent. of the true value. No revenue is

derived in Kansas from poll tax or from licenses. The total assessed value of property as returned in 1880 by the county assessors, is, in round figures, $161,000,000; and, in view of these opinions, it is safe to say the true value of property in this State is not less than $322,000,000.

Of the wealth of this State we now know something; next let us examine into the indebtedness. Below is the correct statement of the local indebtedness of Kansas at the close of the fiscal year 1880:

County bonds	$7,339,666	City warrants	$ 95,039
County warrants	340,228	School district bonds	2,012,707
Township bonds	2,223,579	School orders	29,151
Township warrants	36,476		
City bonds	1,921,758	Total local debt	$13,998,604

There are $1,181,975 of State bonds outstanding. Of this amount, however, $94,275 are in the sinking fund; $9,800 are owned by the State Normal School fund; and $607,925 by the permanent school fund—making a total virtually owned by the State of $715,700; and leaving the total amount of bonds owned, outside of the State funds, $466,275.

The following is an exhibit of the assessed valuation of property:

Aggregate value of taxable lands	$87,510,028.93
Aggregate value of town lots	20,922,021.01
Total value of personal property	31,921,535.94
Valuation of railroad property	20,547,902.55
Total	$160,901,688.43

There are in Kansas 6,697,861 acres of taxable lands under cultivation, and 15,688,574 not under cultivation, making a total of 22,386,435, or an average value per acre of nearly $4.

A carefully prepared analysis of the bonded debt of the cities containing 7,500 inhabitants in the State of Kansas has been made by the Tenth Census, from which I derive several interesting tables.

The following table shows the amounts of outstanding bonded debt issued for the purposes named:

Bridges	$ 50,000	Refunding old debt	$768,551
Cemeteries	10,000	Schools	297,500
Funding floating debt	29,400	Streets	21,870
Public buildings	7,900		
Railroad aid	654,592	Total	$1,839,813

Following are given the amounts drawing the rates of interest named:

10 Per cent	$474,442	5 Per cent	$49,300
8 " "	89,000		
7 " "	857,987	Total	$1,889,818
6 " "	376,084		

The following tabular statement shows the amounts of outstanding debt issued by cities of 7,500 inhabitants and upwards, each year since 1860, and the amounts maturing each year until 1900:

Amounts Issued in Years Named.		Amounts Maturing in Years Named.	
Previous to 1860		Overdue	$ 40,779
1860		1880	190,835
1861		1881	23,435
1862		1882	30,000
1863		1883	29,000
1864		1884	56,848
1865	$ 171,500	1885	31,848
1866	15,400	1886	52,749
1867		1887	39,500
1868	219,300	1888	205,600
1869	79,259	1889	69,530
1870	151,685	1890	130,900
1871	113,985	1891	22,390
1872	241,572	1892	135,215
1873	74,000	1893	95,492
1874	29,878	1894	49,178
1875	73,379	1895	8,633
1876	37,879	1896	14,147
1877	54,231	1897	42,347
1878	230,080	1898	193,647
1879	321,295	1899	80,315
1880		1900	1,147
Unspecified	27,520	After 1900	296,770
Total	$1,889,813	Total	$1,889,813

The accompanying table sets forth the increase or decrease of population of the cities of Kansas of 7,500 inhabitants or more during the last three decennial periods, and shows the assessed and estimated true value of real estate and personal property in 1880, together with the total tax levy and the bonded and floating debt of each of them in the last Census year.

Cities.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Total Ass'd Value of Real Estate and Personal Property.	Estimated True Value of Real Estate and Personal Property.	Total Estimated True Value of Real Estate and Person'l Property.	Taxation. Total Levy	Total Debt.
Atchison	2,616	7,054	15,106	$3,121,530	$2,902,104	$3,980,472	$ 77,479	$449,696
Lawrence	1,645	8,320	8,511	1,648,640	2,315,858	3,087,810	67,791	624,115
Leavenworth	7,429	17,873	16,550	2,995,888	3,699,227	4,932,302	88,202	256,573
Topeka	759	5,790	15,451	2,341,430	3,897,417	5,116,556	101,995	345,400
Totals	12,449	39,037	55,618	$9,307,488	$12,754,606	$17,006,140	$335,567	$1,645,774

The immigration into Kansas has been largely native American. Of its 995,966 inhabitants, 886,261 are natives of the United States. The European population has been drawn from the most industrious classes of the old world, and generally from countries where elementary education is compulsory. In intelligence and a just appreciation of the benefits of intellectual and religious instruction, the people of Kansas stand in deservedly high repute. The manner in which the State has administered the estates granted to it by the general government for school purposes, and added to the fund derived from these by liberal taxation, attests this. It has now a productive school fund of over $2,500,000, and school, university, agricultural college, and normal school lands still unsold, which, at the prices insisted upon by the commissioners, will produce about $10,000,000 more, to be added to the present productive funds. School houses are rising amidst the groves and prairies in every direction. Not fewer than 3,440 of these have been built during the past ten years. As soon as the pioneers' first simple shelters are completed, they turn to select a site, and erect a school house, which serves for school, church, and district meetings, until three or four crops have been gathered, when a simple spire marks the site of the first church building. There are now over 5,000 school houses in the State, of which all but some 260 are frame, brick, or stone. The school property is valued at nearly $5,000,000. The school attendance embraces sixty-nine per cent. of the total school population; which is certainly notable, considering that two-thirds of the total population have been added within the decade. The sparse settlements on the borders of a new State do not usually afford school privileges, thus reducing the percentage of school enrollment; but the above figures are almost identical with what we find in the older States east of the Mississippi. Of church edifices, the Methodist Episcopal Church had, in 1878, 152; next came the Roman Catholics, having 111; then the Presbyterians, with 99; the Baptists, with 69; the Congregationalists, with 59; and other denominations, with 74. The church organizations of each denomination averaged from three to six times the number of its church edifices; indicating the activity with which the religious teachers are endeavoring to provide for the instruction of the people. The public press, with few exceptions, has labored with the people to promote the advancement of the highest interests of the State.

There are nineteen daily papers, circulating 7,029,412 copies annually, and 227 weekly or monthly newspapers, well distributed over the country, so as to express the wishes of the several sections and help shape legislation to meet the continually growing demands of a new State. The State Board of Agriculture, with His Excellency the Governor, and that far-seeing public economist and indefatigable statistician, the late Secretary of the Board, Mr. Alfred Gray, at its head, exerted itself with praiseworthy ability and industry to collect and disseminate information as to the resources of Kansas. This has done much to stimulate immigration and attract capital, the benefits of which are felt in every corner of the commonwealth. Of the 9,249,378.88 acres of the public domain disposed of by the general government in 1879, no less than 2,677,623.77, or about twenty-nine per cent., were in Kansas. There remain on hand in the State more than 40,000,000 of acres subject to entry under the homestead, timber culture, and pre-emption acts. The five land-grant railroads have large quantities of land on hand for sale, on long time, with heavy discounts for cash. The Atchison, Topeka & Santa Fé Railroad has about a million unsold acres; the Kansas Pacific, nearly three millions; the Missouri, Kansas & Texas, over two hundred thousand; the Central Branch Union Pacific, more than two hundred thousand acres. Besides the above, there are the University, Agricultural College, and public school lands, among the best in the State, more than 2,000,000 acres.

At present all the wealth of Kansas is compressed into a comparatively small proportion of its entire area. The four tiers of counties next the Missouri line embrace all the cities of five thousand inhabitants and upwards, except Wichita; they have all the coal mines and about half of all the manufacturing establishments; they contain more than half the cattle and hogs, produce nearly sixty per cent. of the dairy products, poultry and eggs, and own a large proportion of the total real and personal property of the State. These facts indicate, that, surprising as has been the progress of Kansas since 1870, the possibilities of the future are much greater; and it is impossible to look upon the unfolded map of this wide-extended and far-reaching State without anticipations of the most pleasing nature regarding its ultimate greatness.

CHAPTER XIII.

STATE OF NEBRASKA.

NEBRASKA stretches across no less than eight and a half degrees of longitude, from the meridian of 95° 23′ west of Greenwich, to the 104th meridian, the eastern line of Wyoming; and through three degrees of latitude, from the fortieth parallel, the northern line of Kansas, to the forty-third parallel, which, from the Wyoming line eastward to the Keya Paha, separates it from Dakota. The Keya Paha, the Niobrara, and the Missouri rivers, dividing it from Dakota and Iowa, complete its northern, and form its entire northeastern and eastern boundaries. The foregoing definition outlines the whole of Nebraska, except at the southwest corner, where Colorado cuts out a rectangle, bounded on the east by the 102d meridian, and on the north by the forty-first parallel.

Nebraska, therefore, is in the same latitude as all of Pennsylvania north of Philadelphia, Connecticut, Massachusetts, and Southern New Hampshire south of Manchester. Its total area is 76,855 square miles, or 49,187,200 acres. Its length, measured on the 41st parallel, is about 435 miles, and its greatest breadth is 207¼ miles. Although it stretches from the Missouri river westward nearly to the base of the Rocky mountains, so that its western border is almost 5,000 feet above the sea, its surface is nowhere mountainous, but is chiefly one vast prairie, veined with rivers, creeks, and streamlets, that flow through gently sloping vales of picturesque beauty and great fertility. So gradual is the elevation as one ascends the Platte, that not a single deep cut, or considerable fill or trestle, is seen on the line of the Union Pacific railroad between Omaha and the Wyoming boundary. About fifty per cent of the entire surface of the State is beautifully rolling prairie, such as is seen from the tops of the rounded bluffs of the Missouri and over most of Eastern Nebraska. In the northeastern counties, much of the land is more or less broken, but scarcely any of it is so rugged as to be

untillable, except the bluffs themselves. Farther westward, these great billows of verdure subside into immense expanses of table lands, almost a dead level, constituting not far from one-fifth of the State. The valley slopes and benches, marking the old-time river-beds, and the rich, alluvial bottom lands, constitute about fifteen per cent. of the entire surface. The cattle ranges of Western Nebraska are broad tracts of nearly level plains. In the northwest, in the angle between the Niobrara and the Wyoming line, that singular tract of country called the Mauvaises Terres, or Bad Lands, extending down from the White river, in Dakota Territory, laps over into Nebraska. It is named from the fact that it is not only a broken country, but there is little, if any, good water or wood here, while the pasture is poor, and there is scarcely any game. Professor Samuel Aughey, of the State University, says: "Here are some of the most curious remains in the world. The almost vertical sections of white rock have been chiseled by water agencies into unique forms. Indeed, as viewed from a distance, they remind the explorer of one of those old cities which only exhibit their ruins as reminders of their ancient greatness. It is in the deepest cañons, at the foot of the stair-like projections, that the earliest of those wonderful fossil treasures are found, which have done so much to revolutionize our notions of the life of Tertiary times. Here are found the remains of rhinoceri, titanotheriums, and old-time river horses, much like the hippopotami of modern times. Higher up in the deposits, are found countless numbers of turtles, mingled with the remains of land animals. Among these are the wonderful oreontodæ, which Leidy calls ruminating hogs, because their cutting teeth and canines and their feet are like those of the swine family, while their molars are patterned after those of the deer, and the upper portions of the head are much like those of the camel. Several species of fossil monkeys have also been found in these sediments. The vast numbers of these animals were kept within proper bounds by gigantic carnivorous animals, such as sabre-toothed tigers, lyænodons, wolves, etc." These surface deposits are all Miocene Tertiary. Along the Niobrara and the upper branches of the Loup river, and in various places in the western counties, on both sides of the Platte, there are tracts from one to eight miles broad, composed of fine sand and gravel. These usually run parallel with the streams, in hills which change

their forms as the sands drift from place to place in the strong winds that blow here at certain seasons. These tracts are of little account, even for grazing purposes. As they lie in the unsurveyed region and have never been fully explored, their extent is as yet unknown. A number of beautifully clear creeks and rivers take their rise among these sand hills, and the region is dotted with clusters of lakelets. The loveliest portions of the State border the great rivers, where, from the high ranges of beautifully rounded, or almost precipitous bluffs, the eye ranges over grand expanses, checkered with the vari-colored fields of waving grain, or vast, wind-rippled reaches of prairie, horizon bounded on every side, through which wander luxuriant valleys, where the sheen of winding rivers gleams through fringes of cottonwood, elm, willow, walnut, and maple. From these valleys of exuberant fertility, a succession of plateaux, from a few rods to a mile or more in width, rise one above the other, to the foot of the multiform hills that mark the verge of the prairie uplands, with a line of cones, domes, pyramids, or escarpments of shapes innumerable. Through all the western half of the State, the general course of the principal rivers is due east; in the eastern half, all but the Platte flow southeasterly. There are seventy-four creeks and rivers, and thirty-four small lakes, marked on the best maps. Of these, only the Missouri is navigable; and, owing to its impetuous current and treacherous channel, which is continually shifting, the commerce on this river, compared with what passes over any one of the great railways, is almost insignificant. The principal interior river is the Platte, some twelve hundred miles in length. Rising in Colorado and Wyoming, it flows almost centrally through the entire length of the State.

Through a valley of striking beauty and productiveness, three to fifteen miles in width, it sweeps past with a breadth and calm, unruffled flow almost majestic, encircling on its way hundreds of densely wooded islands, and draining and enriching millions of acres of as productive lands as the sun shines upon. Notwithstanding its great apparent volume, it is a very shallow stream, fordable at almost any part of its course, except during the spring floods, when charged with the suddenly melting snow of the Rocky mountains. Its principal tributaries are from the north. Of these, the Elkhorn, some 300 miles long, rising in the north central counties, flows through a valley of three to six

miles wide, across nine of the most productive counties of North-eastern Nebraska. It is a clear, rapid stream, capable of driving thousands of mill-wheels, and is already doing valuable service of this kind. The Loup, still longer than the Elkhorn, is formed of the union of three principal branches, the North, South, and Middle Forks, rising in the central and north central parts of the State. After the union of these branches, it flows with a swift current to join the Platte near the southeast corner of Platte county. Other good-sized tributaries of the Platte are Wood river, Shell creek, and Prairie creek on the north, and Salt creek on the south. The Niobrara is a large, swift, but shallow stream, rising in Wyoming, entering Nebraska near the northwest corner, flowing eastward only a little distance south of the northern boundary for fully 300 miles, to where it receives the Keya Paha, and thence forms the boundary line to its confluence with the Missouri. On its course it receives twelve good-sized tributaries and many smaller streams. The Republican, entering the southeast corner of the State from Colorado, glides through eight of the southern tier of counties, irrigating a magnificent farming country, including a valley from two to six miles broad of exceeding beauty and great fertility. It has fifteen large tributary creeks and small rivers, and carries, much of the year, a large volume of water with a fall of seven feet to the mile. The other rivers of importance are the Great and Little Nemaha rivers, and the Big and Little Blue—all fine, clear streams, skirted with rich bottom lands, in what is now the most densely populated and best-cultivated portion of the State. Scores of flouring mills and other manufactories are erected along these rivers; and they are capable of driving hundreds more. Mr. Harrison Johnson says: "Taken as a whole, Nebraska is remarkably well supplied with water, having, besides the rivers, many clear, running creeks and brooks, supported by never-failing springs. There are large portions of the State where running water can be found on each quarter-section of land; and, where such is not the case, good water can be had, by digging or boring, at a depth of from thirty to sixty feet."

The soil of this State is mainly of lacustrine character. According to the analyses of the lacustrine soils from many different sections of the country, made by Professor Samuel Aughey, the State Geologist, more than eight per cent. of the

soil is insoluble matter, mainly siliceous, so finely comminuted that the grains are impalpable, and only distinguishable under the magnifying lens. The alumina is less than one per cent., so that the body of the soil crumbles under the plow, never bakes, and acts like a sponge to absorb the water, without permitting it to puddle, or stand; while it retains it to serve by capillary attraction as a constant source of supply for vegetation. So that, in this State, crops are seldom either drowned out or destroyed by drought. The other ingredients of these upland soils are, ferric oxide, nearly four per cent; carbonate of lime, over six; carbonate of magnesia, about one and a third per cent.; phosphate of lime, more than three and a half; potassa and soda, about half of one per cent.; and organic matter, a little more than one. And these proportions held good in all the specimens tested; showing remarkable uniformity. A comparison with the Loess formation of the Rhine valley shows a striking similarity between that prolific soil and this. The soils of the river benches and bottom lands differ from the above in having about a fourth less of siliceous matter, from nine to twelve times as much alumina, more than twelve times as much organic matter, rather more of the carbonates, and but one-fourth as much of the phosphates, and the addition of three-fourths of one per cent. of sulphuric acid. The lacustrine deposits cover about eighty per cent. of the area of the State to depths ranging from five to one hundred and eighty feet; while the alluvium of the bottom lands, embracing not far from sixteen per cent. of the whole, varies from two to twenty-five feet in thickness. Much has been said against the alkali lands of Nebraska, but they bear a very small ratio to the whole, and many acres of them are by no means incapable of being rendered fair wheat and rye lands at slight cost by deep plowing and thorough drainage. Of course, the amount of alkali differs very greatly in different localities. In three analyses made by Professor Aughey, the first of soil taken from the Platte valley south of North Platte, the second from near Fort Kearney, and the third from two miles west of Lincoln, the potash varied from 1.68 per cent. to 3.69; while the carbonate and bicarbonate of soda ranged from 4.91 per cent. in the last to 5.17 in the first, and 7.33 in the second specimens.

Of the geology of Nebraska, pending the surveys now going forward, I shall say little except that it undoubtedly corresponds in the main with the geology of Northern Kansas, heretofore

described. The eastern border, for a distance of seventy-five miles in the north, and about one hundred and fifty miles in the south, is underlaid with the Carboniferous formation; which is succeeded towards the west by the Permian, the Cretaceous, and finally, the Tertiary. Good building stone is abundant in the southeastern quarter of the State, where immense quantities of magnesian and common blue limestone are quarried; and an excellent quality of brown sandstone is found. North of the Platte few good quarries have been opened, but building stone exists; although it is not so abundant, nor of such excellent quality as farther south. Going westward, the quality of stone deteriorates, yet there is abundance, in most of the counties, of material for stone fences, of which many miles are made every year. The soft stone taken out of the Cretaceous formation is found to grow hard on exposure, and large quantities of it will be used here, as in Kansas, where similar material has been well tested for nearly all kinds of buildings. The precious metals and economic ores are not found to any noteworthy extent in this State. Bituminous coal of fair quality exists in seams of eighteen to twenty-six inches in the cluster of six counties next the Missouri and Kansas line. The coal mined in Pawnee county is marketed in considerable quantities, and is generally preferred to any other of the Missouri valley coals. The Union Pacific railroad owns extensive coal properties; it is now working them itself. It mined last year 340,152 tons of coal, costing $1.06¼ per ton, and sold it at stations along its entire line at $5.65 per ton, including transportation. Seams of lignite of a few inches thick come to the surface in Dixon county, where the people of the vicinity make use of it for ordinary purposes. It exists in several counties along the Missouri south of Dixon. Very recently a workable seam of bituminous coal of fair quality has been discovered near Ponca, Dixon county. Signs of coal have been discovered also in some of the counties farther west, up the valley of the Republican. Salt marshes of considerable extent, and producing by solar evaporation many tons of salt every year, exist in several parts of the State, 46,080 acres having been granted by Congress as saline lands. Approaching the State capital from the north, one crosses a tract of nearly six hundred acres in the basin of Salt creek, which glistens with acres of salt, that look in the distance like fields of snow. Large deposits of red, brown, and yellow ochre, suitable for mineral paints, in

the river counties of the southeastern border, have attracted the attention of capitalists; good brick clay is common, and is manufactured in many places; peat beds exist along the Elkhorn, the Calamus, the Big and the Little Blue, the Niobrara, and other streams, some of them of great extent and depth; and it is said that extensive deposits of marl, sufficient to fertilize hundreds of thousands of acres, have been discovered in the western portions of the State.

With the exception of some fine tracts of pine, cedar, ash, walnut, oak, and maple, along the Niobrara and Keya Paha rivers and their tributaries, the native trees of Nebraska are limited almost entirely to narrow strips along the water-courses and several finely wooded islands in the Platte and Republican rivers. From five to fifteen per cent of the total area of the eastern counties was originally in woodlands. Catalogues of the flora of Nebraska and Iowa, the former by Professor Samuel Aughey, and the latter by Professor J. C. Arthur, name sixty-five species of trees common to the two States: nineteen found in Iowa, but not in Nebraska; and thirty-eight found in Nebraska, but not in Iowa. Among the Nebraska trees, there are ten species of oak, two of cottonwood, six of hickory, four of elm, three of maple, four of ash, two of locust, three of cedar, two of pine, and one each of chestnut, hackberry, sycamore, mulberry, coffee-tree, ironwood, box-elder, and linden. Of native fruit trees, there are two varieties of plum, two of cherry, two of mulberry, and the paw-paw. Mr. Johnson says that experience shows that a farmer can raise his own fuel in five years, from the seed. Certain it is, that, partly from the rarity in late times of prairie fires, as compared with what used to be the case, the timber skirtings of the streams are growing denser and broader. Tree planting has received much greater attention in this State than in many others. The State Board of Agriculture adopted a resolution, Jan. 8, 1874, setting apart the second Wednesday of April every year as Arbor Day. It is asserted by good authorities that over twelve million trees were planted on the first Arbor Day, in that year, and the day has been observed quite generally every year since. There are many thousands of acres of thrifty trees growing in this State to-day, where there was nothing but open prairie in sight fifteen and twenty years ago. The 7,676 acres of cultivated timber reported to the State Board of Agriculture in 1879,

by no means embraced the whole. In no part of the country has the cultivation of forest trees been conducted more skillfully. Hon. J. Sterling Morton says: "There may be found cottonwood saw-logs growing in Otoe county, which are more than six feet in girth; and when I first saw them [about twenty years before], they were only wandering germs, floating in the air like down;" so rapidly do the rich soil and favoring climate crowd these planted trees into fine, large proportions. Whereas cordwood sold for seven and eight dollars per cord in Nebraska City in 1857, in 1877 the same quality was selling for $3.50 to $5 per cord. Thirty-two species of vines and bushes are enumerated in Professor Aughey's table of Nebraska flora, of which twenty are common to this State and Iowa. Among these are two species of native grape vines, two of gooseberry, two of currants, red and black raspberries, one of blackberry, one of cranberry, and the buffalo berry, peculiar to the trans-Missouri region. Strawberries abound in many localities.

The climate is marked by great extremes of temperature. I have already observed that this State spans all the parallels between Manchester, N. H., and Philadelphia, Penn. The mean summer temperature in different portions of the country ranges from 72° to 74° Fahrenheit, which is considerably higher than that of the Atlantic States in the same latitudes, and corresponds very nearly with that of Southern New Jersey, Delaware, Maryland, Southern Pennsylvania, Southern Ohio, Kentucky, the greater parts of Indiana and Illinois, and the southern half of Iowa. The mean winter temperature of Nebraska, with the exception of a small portion in the northwest and north, is 20°. The mean temperature for the hottest week of 1872, as diagramed on the signal service chart given in the U. S. Statistical Atlas published by the Census Bureau, draws the isotherm of 90° parallel with the Missouri river and about 200 miles west of it, leaving the Missouri valley half way between the isotherms of 85° and 90°. The mean temperature of the coldest week of 1872–73 ranged from zero in Southern Nebraska to 10° below zero in the northern part. One of the unpleasant peculiarities of the States of the great plains is the prevalence of strong winds. These are sometimes extremely disagreeable, and injurious to crops. There is evidence, that, as the country becomes thickly settled, the tendency is to an abatement of such phenomena. Of the rainfall, I shall speak at some length under

the discussion of agriculture. The vital statistics of a State of this age are seldom complete or entirely reliable. So far as I have any data, it appears that there is no more healthy region between the Alleghanies and the Rocky mountains than this.

All of Nebraska is a part of the great Louisiana purchase of April 30, 1803. French traders penetrated to this country even before that time, and carried on a lucrative trade with the Indians for their furs and peltries, but made no settlements. In 1810, the American Fur Company established a trading post at Bellevue, on the Missouri, between Omaha and the mouth of the Platte. In 1834, a mission of the Baptist church was founded at this place, but it was discontinued very soon afterwards. In 1847, a mission of the Presbyterian church was organized here. Buildings for the mission were erected, and church exercises and schools were maintained at this point until the removal of the Indians. In 1848, old Fort Kearney was established at what is now Nebraska City. With the exception of the few white settlers at the points above named, composed of fur traders and their boatmen, missionaries, and soldiers, there were no white settlers in the Territory until after the passage of the Kansas and Nebraska bill, May 30, 1854.* Under that act, Nebraska comprised all of the old Louisiana purchase west of the Missouri river and Minnesota, embracing 351,558 square miles. Captain Fremont's exploring expedition into Utah and California journeyed up the Platte valley in 1842, but the reports of that officer were not calculated to encourage settlements here They conveyed the impression that the most of the region was a vast, arid desert, impregnated with salts and alkalies, and too seldom visited with rains to render farming profitable. Notes like these were made when traveling over lands which have since produced fifty and sixty bushels of corn and twenty bushels of wheat per acre. The Mormons followed Fremont's trail across this country in their exodus from Illinois to Utah, in 1847, but contributed nothing to its settlement. Immediately after the discovery of gold in California, immense caravans of gold hunters and immigrant families entered Nebraska, overland, through Iowa and Missouri, or arrived by river and took up their line of march from Nebraska City, Plattsmouth, Bellevue, and Omaha, for the

* The civil transfers of this region from Louisiana to the District of Louisiana under the acts of Congress of March 26, 1804, and March 3, 1805, then to Missouri Territory, and subsequent changes, have been sufficiently noticed in the chapters on Missouri and Kansas.

shores of the Pacific. All through the years from 1850 to 1854 the travel between the States and our modern Ophir went and came by this route. For the time being, nothing could turn that multitude, struck with the gold mania, aside from their purpose; but, while they passed on their way, the marvelous fertility of the Platte valley was revealed to them, and afterwards they published what they had seen to the world. Later, many of them came back to settle in Nebraska, after settlers from Iowa and other Western States had begun to pour in. The first Territorial officers were appointed by President Pierce, who, in deference to the ruling sentiment of his party, which was strongly pro-slavery, gave the governorship to Francis Burt, of South Carolina. Thomas B. Cuming, of Iowa, was made Secretary. On the death of Governor Burt, who reached Bellevue in ill health on the 6th of October, 1854, and died on the 18th of that month, Secretary Cuming became acting Governor. The first legislative assembly convened at Omaha on the 16th day of the following January.

Considering the great distance of this Territory from the Eastern markets, and its utter isolation from railway communications, the rate of increase of population was rapid. In 1855, a year after the Territorial organization, the population was 4,494; a year later it had more than doubled; and in 1860 it was 28,841. The discovery of gold and silver in Colorado, in 1858 and 1859, led to another era of mining excitement, which, after the first fierce fever had abated, redounded greatly to the advantage of Nebraska. Thousands upon thousands from all of the older States, who had deserted their plows and workshops to rush to Pike's Peak, soon turned back to settle in the fertile valleys of Nebraska and Kansas. The civil war and the unsettled, hostile disposition of the Indian tribes of the Northwest, materially reduced the rate of immigration for several years. In 1864, Congress passed an enabling act for the admission of Nebraska into the Union; but no action was taken towards the organization of a State government until 1866, when the Territorial legislature submitted a form of constitution to the people, which was ratified by them, June 21, 1866. Congress passed a resolution soon after this for the admission of the State; but President Johnson, for good reasons, withheld his signature. In the following January, Congress passed another bill. The president vetoed this, stating as his principal reasons, that the proceedings attending the framing of the constitution did not conform to the

requirements of the enabling act; that the constitution embraced conditions not contained in that act; and that the population did not justify a State organization with the influence in Congress which such an organization would confer. On Feb. 8, 1867, the Senate passed the bill over the president's veto; and the House did the same, the next day, by an overwhelming majority. On March 1, 1867, the president proclaimed the admission of Nebraska to the Union. Since then the increase of population has been rapid, as shown by the following table:

Census Year.	Total.	White.	Colored.	Indians.	Natives.	Foreigners.
1855	4,494					
1860	28,841	28,696	82	63*	22,490	6,351
1870	123,993	122,117	789	6,426*	92,945	30,748
1880	452,433	449,806	2,377	4,046	355,043	97,390

Farming and herding employ much the largest proportion of the population of Nebraska. The ratio is greater than in any other of the Western States except Kansas. Of the 48,636,800 acres embraced in the State, but a small proportion has been reduced to cultivation. In 1879, the total amount in crops, reported to the State Board of Agriculture, for fifty-four counties, was 2,808,198 acres; the total for the entire State, in the eight principal crops, as estimated by the Department of Agriculture at Washington, was 3,378,816 acres.

The principal cereal crops of this State in 1879, stated in bushels, and compared with the crops of 1859 and 1869, as given by Census Bureau's tables of 1860, 1870, 1880, were as follows:

Crops.	1860.	1870.	1880.
Wheat	147,867	2,125,066	13,847,007
Rye	2,495	13,533	424,348
Oats	74,503	1,477,563	6,555,875
Indian corn	1,482,080	4,736,710	65,450,135
Buckwheat	12,224	3,471	17,563
Barley	1,106	216,461	1,744,696
Totals	1,720,278	8,572,842	88,039,613

It would be impossible to demonstrate the marvelous agricultural growth of Nebraska more strikingly than these statistics

* Indians not in tribal relations; besides which, there were, in 1870, of Indians sustaining the tribal relation, 6,382.

express it. They show that in the last decade there was an increase in the product of these six crops of about 930 per cent. Such figures as the foregoing and those contained in subsequent pages answer all doubts as to the productive qualities of the soil and climate of Nebraska, so far as these have been put to the test. But it is observed, that, as yet, but a small portion of the State is in plowed land. Nearly three-fourths of all the wheat, fully ninety-four per cent. of the corn, and eight-ninths of all the hogs, raised in Nebraska in 1879, were credited to the twenty-nine counties lying between the Missouri river and a line drawn from Sioux City through Franklin county to the Kansas boundary. This triangle covers only about one-fifth of the area of the whole State. Honest doubts exist in many minds as to the fitness of Western Nebraska for anything more than pastoral purposes; and efforts have been made by parties largely interested in sheep and cattle herding on the free, open ranges of that section of the country, to induce Congress to withhold the greater part of the lands west of the 100th meridian—embracing nearly half of the State—from entry, under the pre-emption, homestead, and timber-culture acts; and to set them apart forever as open pastures for the encouragement of pastoral pursuits. This led the Hon. Robert W. Furnas, President of the State Horticultural Society, and Hon. Martin Dunham, President of the State Agricultural Society, to address a letter to Professors Samuel Aughey and C. D. Wilber, asking them, as scientific experts, and actual explorers of a very large proportion of the State, to furnish data and express their judgment on this subject. I can not quote in full the exceedingly instructive reply of these gentlemen, given under date of Feb. 8, 1880; but they say, basing their statements on repeated experiments and observations covering a period of twenty years: "The soil of the Western States and Territories beyond the 100th meridian, in Dakota, Nebraska, Kansas, Colorado, Wyoming, Montana, Idaho, Utah, Nevada, Oregon, Washington Territory, and California, is, chemically considered, equal to any similar area of soil, taken in any part of the American continent. We are certain that analysis will show everywhere in these great areas, that the soils are, chemically and mechanically, approximately the same for the mountain areas and the foot-hills—being only the result of glacial grinding and distribution—while all over the plains are

spread the vast deposits of the great cretaceous seas and tertiary lakes. The only practical question, therefore, is as to the supply of moisture. It is asserted that the rainfall beyond the 100th meridian is not sufficient for the cultivation of the cereal small grains, corn, root crops, and fruit. While this may be the case in portions of this territory—in Colorado, Wyoming, Utah, and some other sections—the present rate of increase in rainfall will, in a comparatively short time, fit this region for agriculture without the aid of irrigation. In the eastern portion of this region, which it is proposed to condemn, the rainfall even now is sufficient for agricultural purposes, as proved by actual experience, in the profitable production of corn and other grain. The average annual rainfall of twenty-six inches (as deduced from a great number of observations by individuals and the Government Signal Service) reaches almost to North Platte; and beyond that point, at least in Western Nebraska, the annual rainfall amounts to from nineteen to seventeen inches. As a large amount of this occurs in early summer, at the time when crops most need moisture, it is clear, as has also been proved by experience, that the rainfall, with proper cultivation, is sufficient to produce, successfully, root crops, fruit, corn, and other cereals. This is the more apparent when we compare the rainfall here with that of favored localities in Europe." It appears that the plains of Castile, so famous in history, only receive an average annual rainfall of ten inches; Lisbon, only twenty-seven inches; Central and North Germany, no more than North Platte, only twenty inches; Hungary, but seventeen inches, or two inches less than Western Nebraska; while, according to Guyot's "Earth and Man," page 162, the annual rainfall of Eastern France is but twenty-two inches, which is less than that of Central Nebraska, along the eastern border of the section these gentlemen ask Congress to stamp as wild pasture lands forever. Professors Aughey and Wilber maintain, moreover, that the rain belt is gradually moving westward; as does Mr. Clarence King, the chief of the United States Geographical Survey,* who avers, that, between the Stansbury Survey, in 1850, and his own, there was an increment of 600 square miles in the area of Great Salt Lake, and a rise of eleven feet. He says that Mono and Owens Lakes, at the east base of the Sierras, show a corresponding rise. From a series of meteorological observations, Mr. King

* "Systematic Geology of the Fortieth Parallel," page 525.

infers that this region entered upon a cycle of increased moisture between 1860 and 1870, the first of its kind for over 270 years. "The destructive Sierra avalanches," he says, "began about 1860. Mono Lake showed a rise in 1864. The year 1866 is about the date of the increase of Salt Lake." From these facts, and others bearing on this subject, Mr. King reaches the conclusion that there is a wave of increased moisture steadily extending eastward.* Among the many natural indications of an increase of moisture in Central and Western Nebraska, cited by Professors Aughey, Wilber, and other observers, are the following: The disappearance of vegetable forms characteristic of dry regions, and the appearance of species native to moist districts; the appearance of springs where there were none before; and the re-appearance of water in creek and river beds which had been utterly dry for years, and in some cases overgrown with a thick grass sod. Twenty years ago it was said that wheat could not be grown on the Nebraska uplands: When, a little later, these lands were found to produce even better wheat, in some seasons, than the bottom lands, it was said that this could only occur for a limited section along the Missouri river. As these limits kept extending westward, with the line of actual settlement, the croakers fixed upon the 100th meridian as the western extreme of agricultural lands. But farmers have already pushed up the Republican and Platte valleys beyond this so-called limit, and proved it to be a limit only by conjecture. On the other hand, it is indisputable, that every few years the benevolence of the country at large is appealed to, to provide for Kansas and Nebraska pioneers who have pushed beyond what are recognized as the tolerably thickly settled portions of the interior, and have lost their crops through drought. During the summer and fall of 1879, the western outskirts of the settlements in Kansas and Nebraska were terribly scourged by drought, a misfortune not unlikely now and then to befall other attempts at settlement far in advance of the area previously reduced to successful cultivation. "But similar misfortunes befell the first settlers in what are now some of the richest counties of the State," is the popular reply to this objection; and still the tide of immigration flows onward. Not a few scientists are still unwilling to accept the opinion of Professors

* This conclusion is stoutly contested by many observers of high scientific repute, who maintain that the rise of these lakes is due to local causes, and not to any wide-extending climatic change.

Aughey, Wilber, and others, upon this matter. Whether their opinion as to the possibility of the agricultural development of Middle and Western Nebraska without irrigation, is correct, is likely to be determined entirely outside of the school of theory. Let us return to the sections already profitably cultivated. That settlement and cultivation of the country—the breaking of ground, planting of trees, and general increase in vegetation—have induced increased moisture, is undeniable. These improvements prevent the rain from running off immediately, and permit it to sink into the earth, which results not only in increased moisture of the ground, but also of the atmosphere immediately above it. Thus, to a certain degree, settlement begets settlement; and many who are not convinced that there has been any decided and constant increment of the annual rainfall, nevertheless concede that in this way cultivation, without irrigation, of what was formerly supposed to be an arid region, has been made practicable. To what extent this can be carried on, is still an open question. Whatever the possibilities of cultivation without irrigation in Western Kansas and Nebraska may be, it is certainly gratifying to note that the people of these two States are taking an intense interest in the question of irrigation. A notion prevails in some quarters, that the fluctuations in the yield of crops are greater here than in most Western States. The Statistics of the Census Bureau do not sustain this notion; and the following table, showing the annual average of crops for five years, when compared with similar tables for other States, indicates, that, if there is any difference, it is usually in favor of Nebraska:

Crops.	Total yield of crop of 1879 in bushels, pounds or tons.	Average annual yield in bushels, pounds or tons for 5 yrs. ending 1879.	Average price per bushel, pound or ton for 5 years, ending 1879.	Average annual value of crop for 5 years ending with 1879.	Average annual yield per acre for 5 years ending 1879.	Average annual value per acre for 5 years ending 1879.
Indian corn	6,750,000	41,736,320	$ .20	$8,241,390	38.0 bu.	$ 7.65
Wheat	1,000,000	8,057,298	.70	5,156,127	12.1 "	8.60
Rye	12,000	691,695	.31	223,859	13.6 "	5.24
Oats	1,250,000	5,173,900	.20	1,017,463	33.1 "	6.51
Barley	9,000	706,750	.34	247,847	22.6 "	7.85
Buckwheat	50,000	54,300	.66	37,590	20.8 "	13.97
Potatoes	550,000	1,563,000	.30	451,680	103.0 "	29.85
Tobacco						
Hay		489,080	3.43	1,667,371	1.59 T	5.44
Total				$17,043,336		

The spring wheat of Nebraska rivals in weight per bushel and quality the famous spring wheat of Minnesota. While much the largest proportion of the crop of Kansas is in winter wheat, less than one-fourth the crop of Nebraska is in that variety. It is too early in the history of this State to determine what are by nature the best sections for specific crops. More than half the wheat of 1878 was raised in seven counties south of the Platte —Saunders, Lancaster, York, Fillmore, Hamilton, Cass, Saline, and Adams; and two counties north of that river, Dodge and Boone. Cedar county, on the Missouri, in the extreme northeast, just below Yankton, with a product of 2,826,259 bushels of corn, averaging forty bushels to the acre, ranked first among the corn counties; and Richardson, in the extreme southeast, wedged between the Missouri river and the Kansas line, stood next, with a product of 2,215,810 bushels, averaging thirty-six and a half bushels to the acre. At the same time, it is to be remarked, that the ten contiguous counties in the southeastern angle of the State—Cass, Lancaster, Seward, Saline, Otoe, Gage, Johnson, Pawnee, Nemaha, and Richardson—produced, in 1879, sixty-two per cent. of the total corn crop. These embrace the oldest settlements in the State, and the heaviest stock district of the farm region. Flax is raised in considerable quantities and does well in this State. The crop of 1879, in thirty-five counties, amounted to more than 82,000 bushels of seed. Little or no care is taken of the fibre. The broom corn produced in twenty-eight counties amounted to over 1,650 tons; and the millet seed harvested in thirty-two counties, to 30,000 bushels. This is so far as reported by the State Board of Agriculture; but the returns are confessedly very incomplete, and can not be taken as anything more than a tolerably correct approximation. Mr. Furnas, President of the State Horticultural Society, writing to the American Pomological Society, says none of the first settlers believed fruit trees could be grown in Nebraska. "Fruit growing," he adds, "was simply hooted at." Further on he writes: "At the State Fair, at Lincoln, September, 1877, over two thousand plates of fruit were on exhibition, embracing 275 varieties. The successes which have followed our fruit culture, and the creditable exhibits made at home and abroad, warrant the conclusion and assertion that Nebraska is peculiarly a fruit-growing region; especially the counties bordering on the Missouri river and other principal water-courses." Full orchard statistics are not

obtainable. As an indication of the attention given to fruit-raising, take the following examples from among the older counties: In Sarpy county, in 1879, there were 27,512 apple trees, 810 pear, 6,297 peach, 1,127 plum, and 4,305 cherry trees, besides 9,834 grape vines. The same year, Cass county reported 105,687 apple, 1,279 pear, 49,378 peach, 3,572 plum, 13,578 cherry trees, and 6,221 grape vines. These counties lie next to the Missouri river, south of the Platte. Dodge county, north of the north bend of the Platte, and in the second tier from the Missouri, reported 20,082 apple, 544 pear, 10,359 peach, 11,271 plum, 2,696 cherry trees, and 1,310 grape vines. Mr. Benton Aldrich, of Clifton, Nemaha county, states that fifty-four apple trees planted in 1869, produced in 1877, 324 bushels of apples, which sold for $264.40. At this rate, the products per acre would amount to $500. The grasshoppers were very destructive in Nebraska, in 1876, utterly destroying thousands of orchards and planted groves, as well as the grain in the fields. The ravages of these insects diminished in the two years following, and have been unworthy of note since.

I am confident that the farm animals of this State are increasing much more rapidly than any assessor's list, or the statistics of the Department of Agriculture at Washington represent. It is simply impossible for any one to state the number of cattle and sheep now upon the open ranges of Western Nebraska. The assessors can not get at them; and in most cases the owners themselves can do little more than estimate their flocks and herds. This they can do with considerable accuracy, at the annual "round up," when different herders unite, drive the herds in from all the neighboring ranges, and sort out each man's stock and brand it. The following table, based on the estimates of the Department of Agriculture, is reliable for horses, mules, milch cows, and hogs; but the statistics of sheep and cattle are regarded by persons of good judgment, familiar with the Western ranges, as under-estimates. This table shows the increase in the number of farm animals in Nebraska during the ten years ending January, 1880:

Farm Animals.	1870.	1880.	Farm Animals.	1870.	1880.
Horses	31,500	176,100	Milch cows	48,300	142,900
Mules	1,700	15,200	Sheep	25,000	172,800
Oxen and other cattle	207,036	428,000	Hogs	125,000	698,700

The following table shows the number of farm animals in this State in 1870, compared with the annual number averaged for the five years ending with January, 1880. It also gives the price per head and the total value averaged for the same period:

FARM ANIMALS.	Number in February, 1870.	Annual number of animals averaged for five years ending Jan., 1880	Price per head averaged for the five years, ending Jan., 1880.	Total annual value averaged for five years.
Horses	31,500	125,740	$67.37	$8,414,402
Mules	1,700	10,960	92.21	979,816
Oxen and other cattle	207,026	256,881	20.78	5,327,265
Milch cows	48,800	101,220	23.43	2,660,238
Sheep	25,000	97,720	2.66	255,679
Hogs	125,000	362,680	5.76	1,860,345
Total				$18,907,755

The four contiguous counties along the Missouri river, between the Platte and the Kansas line, together with Lancaster and Saunders, lying next west of these, raised, in 1879, about one-fourth of all the cattle east of the 100th meridian, or in the cultivated portions of Nebraska. At the opposite extreme of the State, in the far west, along the Upper Platte, are the cattle ranges of Nebraska, that have lately attracted the attention, not only of this country, but of Europe, which receives a considerable part of their product every year. In 1879, Cheyenne, Keith, Lincoln, and Custer, adjoining Lincoln on the northeast, reported more than one-fourth of all the cattle of the State. The descriptions of these pastoral regions and the rapid development of cattle and sheep raising here, which have appeared in the leading London journals, have awakened the liveliest interest in this subject. Mr. Edwin A. Curley, "Commissioner from the *Field* to the emigrant fields of North America," in his work entitled, "Nebraska; Its Advantages, Resources, and Drawbacks," treats this subject under the head of "Pastoral Marvels." And, indeed, the tales of fortunes made in this strange, primitive life, far out upon the borders of civilization, seem almost as wild as stories from the "Arabian Nights." Here the use of the land for pasturage costs the ranchman nothing. Nor has he any other expenses of large amount. The ranch buildings are rude, inexpensive corrals, hay-covered sheds, and a shanty for the use of the herders, and other employes engaged in marking, branding, and shipping the stock. Little or no provision is

made for sheltering the cattle in winter. In ordinary winters there seems to be little need of such provision; but, in such a winter as is upon us at this writing, the loss from exposure and starvation will be very considerable. It is estimated that it may reach ten per cent. of the entire herds. All through the spring, summer, and autumn, the abundance of nutritious grasses growing luxuriantly in the valleys supplies every want. Hay can be gathered in and stacked at a cost of $1 per ton; and, when this is so, it seems reckless and cruel for the ranchmen not to lay up an ample supply against the chances of a severe winter. In an ordinary winter, cattle will not only keep well, but will actually fatten, on the buffalo grass and bunch grass, known in Texas and New Mexico as mesquite grass. The animals will paw away the snow from this self-cured fodder and thrive on it where it would seem as if they must starve. It is claimed that the cost of raising a steer of 1,200 pounds on these plains is less than that of raising a yearling calf in the European states. Tens of thousands of cows and heifers are driven to these ranches every year from Indian Territory and Texas, and bred with pure-blooded stock from the best stock farms of the older States and Canada. The improved cattle fattened in Eastern Nebraska or Iowa command at New York nearly as high prices as the native cattle of the East. The profits of this business, rightly conducted, taken year in and year out, average from thirty to fifty per cent. per annum. It is a rude, arduous life; but such profits as these are attracting great numbers into this business; and the best locations for ranches are being occupied very rapidly. Indeed, many of the best natural sites, in the forks of rivers, which serve as fences for the herds, are already occupied.

Sheep husbandry is growing encouragingly in Southeastern Nebraska. A cluster of twelve counties between the Little Blue and the Missouri, contained, in 1880, one-half of all the sheep in the State. Sheep husbandry is extending up the valleys of the Platte and Republican, and is growing rapidly in Central Kansas, particularly in Dawson, Custer, and Lincoln counties. Comparatively little attention has been given to dairy farming until of late. The wonderful growth of this industry in Iowa has inspired interest in the same subject in Eastern Nebraska, which is fully as well adapted to dairy farming as Western Iowa. Butter and cheese factories have been established

in many of the richest counties, and with very encouraging results.

Manufacturing industries are in their infancy here, but are growing vigorously, as the following table shows :

Items.	1850.	1860.	1870.	1880.
Number of establishments		107	670	1,377
Hands employed		336	2,665	7,281
Capital invested		$266,575.00	$2,169,963.00	$4,348,780 00
Wages paid		105,382.00	1,429,913.00	1,716,979.00
Materials		237,215.00	2,902,074.00	11,300,587.00
Products		607,328.00	5,788,512.00	16,670,090.00
Per capita production		1,807.53	2,153.29	2,289.53

The above figures are approximately correct. The revised statistics of 1880 can change them but little. The manufactures are such as are most demanded by new agricultural States. There are scores of flouring and grist mills. Agricultural implements are imported in immense numbers, but the incessant call for more has led to the successful beginning of home manufacture at Omaha, Nebraska City, Fremont, West Point and other places. Blacksmithing, sheet iron, tin and copper, carriage, wagon and machine shops are increasing in number and production only less remarkably than the agricultural growth. Breweries, distilleries, oil mills and tanneries are multiplying. This is the first decade in which Nebraska appears in the census reports of iron and steel production. The product in 1880 was 2,000 tons of rolled iron, manufactured into 40,000 kegs of cut nails. Omaha and Nebraska City are already prominent as manufacturing centres. These cities, and Lincoln, Hastings, Plattsmouth, Fremont, and other places have foundries and furniture establishments, besides all or several of the industries named above. Some of them have important car shops. Omaha has the extensive car shops of the Union Pacific Railroad. Brick making, quarrying, lime burning, building, and house painting and decorating employ thousands of hands as would be naturally expected of a State which has increased its population 267 per cent. in the last ten years. Besides other important industries of Omaha, mentioned before this, it has immense distilleries and breweries, successful pipe, bar and sheet lead works, paint and oil works, a safe and vault factory, flourishing publishing, cigar and tobacco, boot and shoe, clothing, tin, copper and sheet iron establishments, a file factory, a soap factory, gas works, and various machine shops.

Worthy of special mention in this connection, are the Omaha Smelting and Refining Works. Of the 57,809,535 pounds of gold and silver bearing ores received at Omaha from the West, in 1878, the greater part was smelted at the above works, asserted to be the largest on the continent.

The enormous volume of trans-continental commerce journeying to and fro across the entire length of Nebraska, upon the Union Pacific Railway, pays only passing tribute to the State. But the commerce that centres within its borders is assuming grand proportions. Besides its share of the State traffic, Omaha shares largely in the trade of the Upper Missouri and its tributaries; conspicuously in that of the various military posts and Indian agencies. It controls, also, no mean portion of the trade with the Black Hills. I have no data to show the proportion of the traffic over the Union Pacific Railway that pertains to this State; on the other hand, the traffic over the Burlington & Missouri River Railway in Nebraska may be regarded as mainly a part of the State commerce. It will give some conception, then, of what this amounts to, to note, that, over this single highway, there were received, in 1878, over 82,000,000 pounds of merchandise, 19,000,000 of immigrants' movables, 102,000,000 of lumber, 44,000,000 of coal, and 10,000,000 of stone and brick—or, to be exact, a total of 258,031,429 pounds; while the amount forwarded, was over 22,385,693 pounds of merchandise, 8,447,250 of mill products, 422,746,000 of grain, 56,647,000 of live stock, and 8,832,000 of stone and brick.

The transportation of this State embraces the best natural roads on the continent, its railways, and the Missouri river. In the early days of immigration to Utah, California, and Oregon, and through the first years in the settlement of Kansas and Nebraska, this stream rendered most important aid in that mighty exodus which resulted in the founding of our trans-Missouri and Pacific empire. Now, its principal office is to perform similar service, but on a much smaller scale, for the government posts and the sparse settlements on the Upper Missouri, above the present reach of the railroads. If it were possible to pass steamboats of a thousand or two thousand tons burthen down the Missouri and up the Illinois to Chicago, as could easily be done in case the improvements advocated in the chapter on Illinois were completed, and the Missouri river were properly cared for, it would be reasonable to expect

that immense quantities of the products of Nebraska would take this route to the great staple town of Western commerce. The possibility of such shipments would, at least, exercise a wholesome restraint upon the lords of railway traffic.

It is unnecessary to expatiate upon the railway systems of this State. They have all been developed since Dec. 8, 1863, when the first ground was broken for the Union Pacific Railroad. Railroad construction did not begin in earnest until after the first fifty miles were completed, Jan. 1, 1866. At the close of 1880, Nebraska contained 2,032.1 miles, 398.4 of which were added in that year. Besides its main line from Omaha to Ogden, 1,033 miles, the Union Pacific owned and operated, in 1877, six branches, embracing 836 miles, making a total, within and without the State, of 1,869 miles. Its gross earnings increased from $7,625,271.11 in 1870, to $12,886,858.84 in 1876, when its net earnings were $7,618,211.29. It had a total passenger and freight equipment of 3,384 locomotives, passenger, baggage, and freight cars. With the road now under construction, the Burlington & Missouri River Railroad Company owns and operates about 600 miles of road in Nebraska, consisting of 190 miles of main line, extending from Plattsmouth to a junction with the Union Pacific Railroad at Hastings, and several north and south branches, penetrating a number of the wealthiest or most promising counties, and making important railway connections. When all these roads are completed, they will constitute a system of 832 miles of railroad running through the richest lands of the State, all under one management; which at the same time controls more than two thousand miles in Iowa, Illinois, and other States. The Sioux City & Pacific, the Atchison & Nebraska, the Fremont, Atchison & Nebraska, the Omaha & Northern Nebraska, and the Covington, Columbus & Black Hills railroads are all so many distinct corporations serving to open up this country for the advancing columns of immigration.

On Nov. 1, 1880, there were ten National banks in operation in Nebraska, with a capital of $900,000, and outstanding circulation of $721,960; besides eighty-three banks other than National, with a capital of $653,890, and deposits amounting to $2,019,814.

The following shows the assessed valuation of real and personal property in Nebraska, the amount of school district debt,

the State school tax, and the bonded and floating debt of counties as returned in 1880:

Real estate valuation	$53,868,105
Personal property valuation	35,955,814
Total	$89,823,919
School district debt	$ 948,800
State tax for other purposes than schools	381,914
State school tax	108,505
Bonded debt of counties	4,589,069
Floating debt of counties	519,425

Real estate and personal property are assessed every year in such manner as the legislature may direct. This assessment is equalized by the town boards. Returns from a number of counties in Nebraska show that real estate is assessed at from thirty-six to fifty-five per cent. of its true value. From this, it is safe to estimate that the assessed value is about four-tenths of the true value; and on this basis the true value of property would be $224,809,797. The following is an exhibit of the financial condition of the two principal cities of the State, according to the Census of 1880:

Cities.	Population.	Total Assessed Valuation.	Total Tax Levy.	Bonded Debt.	Floating Debt.	Gross Debt.
Lincoln	13,004	$1,133,389	$ 76,504	$190,585	$ 9,080	$199,615
Omaha	30,518	7,512,683	349,007	237,950	40,000	* 277,950
Totals	43,522	$8,646,072	$425,511	$428,585	$49,080	$477,565

The population of the two chief cities of Nebraska at several decennial periods, the total assessed and total estimated value of real estate and personal property, and the total debt and total tax levy, as tabulated from the Census Bureau statistics, are as follows:

Cities.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Total Ass'd Value of Real Estate and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of Real Estate and Person'l Property.	Taxation. Total Levy	Total Debt.
Lincoln	.....	2,441	13,004	$1,133,389	$ 1,977,997	$ 2,687,389	$ 76,504	$199,615
Omaha	1,861	16,083	30,518	5,862,411	7,683,193	10,944,297	349, 007	277,950
Totals	1,861	18,524	43,522	$6,995,800	$9,661,190	$12,631,686	$425,511	$477,565

* The city of Omaha has a sinking fund of $26,372.

The foundations of the public system of education were laid broad and deep by the land grants for this purpose from the general government—embracing the sixteenth and thirty-sixth section in every congressional township (2,643,080 acres)—besides 46,080 acres granted to the State University, 90,000 acres to the Agricultural College, and 12,800 acres of saline lands set apart by the State for the endowment of the State Normal school at Peru. The following table, compiled from the last report of Hon. S. R. Thompson, State Superintendent of Public Instruction, exhibits the expansion of the public school work of Nebraska for the past ten years:

Items.	1871.	1875.	1880.
Number of school districts	1,028	2,405	3,182
Number of school houses	558	2,018	2,701
Children of school age	41,071	80,123	142,348
Children in school	28,265	55,423	93,549
Per cent. of attendance	.56	.69	.65
Number of teachers	1,080	3,091	4,100
Number of graded schools	.....	38	70
Total school receipts	$371,888.73	$ 928,188.00	$1,294,127.65
Total school expenditures	365,520.38	1,054,817.09	1,349,793.03
Value of school property	420,936.66	1,848,289.00	2,064,768.32
Total indebtedness	73,469.63	105,817.09	1,008,799.28
Apportioned from State fund	138,849.40	202,471.49	208,408.30

The productive permanent school fund has already reached the grand total of $3,323,217.19, while 2,443,148 acres out of 2,643,080 acres originally granted for common school purposes, still remain unsold. It is estimated, that, when all these lands are disposed of, the permanent school fund of Nebraska will amount to at least $15,000,000. Thirty-five teachers' institutes were held in 1879 to 1880. The State Normal school at Peru is pronounced by the Superintendent "one of the best in the United States." It has an enrollment of 275 teacher-pupils, representing thirty-six counties. The State University at Lincoln is authorized to establish five colleges—a college of literature, science, and art; an industrial college, embracing schools of agriculture, practical science, civil engineering, and mechanic arts; a college of law; a college of medicine; and a college of fine arts. As yet, only the first two have been organized. These have now an attendance of 270 students. The University has an endowment of 46,080 acres, and the Agricultural College has an endowment of 90,000 acres. Not a single acre of the latter endowment has been sold—the State meeting all current

expenditures for the present, while the land is enhancing in value. There are four denominational colleges, or seminaries, and two private academies, having about 700 students in attendance. The State has provided liberally for its unfortunates—the blind, the deaf and dumb, and dependent and neglected children. Paupers there are none, except the decrepit and the vicious; for there is abundance of work for all able-bodied persons. The church organizations in a new and rapidly growing State like this greatly outnumber the church buildings; for, as another has well said, the pioneers of the several denominations "have gathered the people for worship in groves, in the open air, in 'dug-outs,' in private dwellings, and in school houses, until they could erect churches." To-day, there is no city or large town without comfortable, and in many cases elegant, church edifices; while on the frontier the advance of the church pioneers keeps pace with the emigrant trains. Considering her years, Nebraska has reason to point with pride to her church and school privileges. At twice her years, the States east of the Mississippi made but a poor comparison in their school privileges with what we see on these prairies, so recently redeemed from the dark and bloody sway of the savage.

The first printing press entered this country along with some of the earliest missionaries; and in all that has been accomplished since then, in transforming the open prairies into farms and cities, gardens and orchards, the public press, at home and abroad, has done its full share. There are now 181 newspapers in the State, of which fourteen are daily, one tri-weekly, one semi-weekly, 157 weekly, two semi-monthly, five monthly, and one quarterly. The fourteen dailies issue 4,659,780 copies per annum.

What will this broad expanse of territory, so wisely governed by a free people, become in the future? I can not undertake to answer; but surely its present is full of auspicious prophecy. Consider that four-fifths of the present population of Nebraska is sparsely scattered over only about one-fifth of its entire area, along its eastern border. All its cities of five thousand inhabitants and upwards, and ninety-five per cent. of all its manufacturing interests, lie within these same narrow limits; while more than four-fifths of its agricultural products have been gathered from a cultivated area of less than one-fifth of this fraction of the State, or, say, from one-twenty-fifth of the whole. With

over 25,000,000 acres of such improved lands as I have described, to be had in fee simple, under the homestead and timber-culture acts, for the using, or otherwise, at from $1.25 to $5 per acre, it ceases to be marvelous, that, in the year ending June 30, 1879, 1,368,465 acres of government lands were disposed of in Nebraska. I have not the exact figures for 1880; but I understand that the amount was still greater. In the same year, the lands sold by railway companies and private parties, reached full a million more. The Union Pacific Railroad has still about 3,500,000 acres in Nebraska, for sale at from $2 to $10 per acre, payable in ten annual installments at six per cent. interest; and the Burlington & Missouri has more than a million acres to sell on similar terms. The sales of railway lands in 1879 to 1880 amounted to nearly a million acres. It is estimated that there are now about 20,000,000 acres of government lands in the North Platte Land Office district, about 850,000 in the Niobrara Land Office district, about 1,000,000 in the Grand Island, about 1,000,000 in the Bloomington, and some 400,000 in the Norfolk Land Office district. There is very little good land unclaimed in the Beatrice and Lincoln Land Office districts. Now that the fertility of this country is so widely known, immigration—composed mainly of thrifty Americans, English, Scotch, and Scandinavians, possessed of a good degree of education and shrewd intelligence—is distributing itself through the State at a rate hitherto unparalleled in Nebraska history; capital flows in with them or follows close after; new industries are springing up on every side; and all classes of the population seem exhilarated with unbounded faith in the continuance or acceleration of the present rapid rate of State growth.

CHAPTER XIV.

STATE OF COLORADO.

Of all the States and Territories of the far West, with the single exception of California, Colorado has had the most rapid development. This is due not a little to the accident of location, in addition to great natural resources in the form of mineral deposits, and of arable and pasture lands, but most of all to the energy of its early settlers, who, casting in their lot with the State while it was in its infancy, having unlimited faith in its resources and in themselves, devoted their best years to its development. They built railroads over the trackless plains, mortgaging the unknown future for the business wherewith to sustain them. They laid out towns and built school houses and churches, in the firm faith that inhabitants would not be wanting—and the end is now justifying their expectations. With all this, it goes without saying that Colorado has been the best-advertised State or Territory in the Rocky Mountain region. Libraries have been written upon the magnificence of its scenery, the healthfulness of its climate, the profits, certain and fabulous in amount, from investments in its mines, its wheat fields, and its cattle farms.

Colorado lies between the parallels of latitude of 37° and 41° and the meridians of 25° and 32° of longitude west of Washington. Its area is very nearly 104,000* square miles. It was made up in part from the Louisiana purchase, in part from territory ceded by the State of Texas. It was organized as a Territory in 1861, from parts of Kansas, Nebraska, Utah, and New Mexico. In 1876, it was admitted to the Union as a State.

The history of the settlement of Colorado is mainly a history of its mining industry. There has been, however, since 1860, a steady under-current of growth of its farming and grazing interests, which, however affected by the vicissitudes of mining,

* The Tenth Census states it at 103,925 square miles.

has, on the whole, increased year after year, forming a solid basis for prosperity.

It was in 1858 that gold placers were discovered on Cherry creek and other streams at the east base of the mountains; and the tide of mining emigration, which ten years before had inundated California, turned in this direction. Within the next two or three years, scores of thousands of people flocked to this new El Dorado. Denver sprang from a stage station to a city, it might almost be said, in a night. A line of alleged cities rose along the east base of the mountains, like Jonah's gourd. But the mountain barrier did not stop this surging wave of humanity. The miners swept over it, and discovered the placers in South Park, and in California and other gulches in the valley of the Arkansas. They went even farther, over into the Elk and San Juan mountains, and were only stopped finally by hostile Indians and the desert. Then followed the old story: The placers were quickly worked out, under the wasteful system, or want of system, which was pursued; and the greater part of these adventurers left the Territory, to skim the cream from other mining regions, Nevada or Montana. Those who remained, stayed to develop the vein deposits, the sources of the placers.

Then it was that the agricultural and grazing capabilities of the Territory began to be seen and developed; and from that time until the discovery of the silver deposits at Leadville the growth and development of the State largely depended upon these interests. Mining was no longer the paramount pursuit, that upon which everything hinged; although there was a steady and profitable development in that direction. The discovery of methods for treating the refractory sulphuret ores, which were the principal ones of Colorado, and the erection of smelters in the neighborhood of the mines, ensured for them a permanent value. The discovery, in 1877, of the enormous deposits of silver and lead ore at Leadville gave a tremendous impetus to the development of the State. A mining fever, of a magnitude and character equaled only by that of '49 and '50, followed this discovery. Within the three years that have since elapsed, the State has gained fully a hundred thousand in population. The city of Leadville, of nearly 15,000 souls, has been built up in the wilderness. Discoveries of mineral deposits have been made all over the State; and capital has flowed thither

from the East with the utmost prodigality and recklessness.

The surface of the State is extremely diversified, presenting every variety of scenery, from the grandest and most rugged mountains, to the monotonous roll of the endless plains. The eastern portion of the State, comprising 45,000 square miles, or nearly one-half, consists of treeless plains, undulating, arid, grass covered—pasture lands *par excellence*. The middle portion, comprising about 32,000 square miles, is mountainous, more or less rugged, and contains several large and fine valleys, which lie at a great elevation. West of the mountain region, extending far into Utah, stretches a series of arid plateaux, covering the remainder of the State, or 17,000 square miles.

The mean height of the State above sea level is approximately 7,000 feet, it being the highest of the States and Territories. The lowest point, which is on the Arkansas river, at the eastern boundary, is about 3,000 feet; while many mountain peaks rise above 14,000 feet.

The general elevation of the State—which, as it governs in great part its climate, is a very important consideration—is best illustrated by the following table, showing the total number of square miles within each thousand feet of elevation:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
3,000 to 4,000	9,000	9,000 to 10,000	10,000
4,000 to 5,000	21,800	10,000 to 11,000	6,800
5,000 to 6,000	15,000	11,000 to 12,000	5,000
6,000 to 7,000	10,000	12,000 to 13,000	1,400
7,000 to 8,000	11,000	Above 13,000	800
8,000 to 9,000	14,000		

From the above table, it will be seen that four-fifths of the State is between 4,000 and 10,000 feet above sea level.

The general slope of the plains is towards the east. At the base of the mountains, they are from 5,000 to 7,500 feet above the sea; while at the east boundary of the State they range from 3,000 to 4,000 feet. Their surface is rolling or undulating, with broad, flat valleys and low divides. They are watered by the South Platte, Republican, and Arkansas rivers, with their branches. The first and last have their sources in the mountains, in many streams, which unite in the plains. The Republican rises and flows throughout the plains.

From the base of the mountains, near latitude 39°, a broad, flat ridge, merely a swell in the plains, runs eastward, separating the drainage of the South Platte from that of the Arkansas.

This "Arkansas Divide" has an elevation at the base of the mountains of about 7,500 feet, but decreases in height toward the east. Northward, the plains at the base of the mountains slope gently down, following the valleys of Plum Creek and the South Platte, to an elevation at Greeley, near the north boundary of the State, of 4,780 feet. Southward the slope is more rapid. At Pueblo, the elevation is about 4,800 feet; thence southward the level of the plains rises and falls with the divides and valleys, keeping an average elevation along the base of the mountains of about 5,500 feet.

With the exception of a few groups of eruptive mountains, the whole mountain area is made up of a succession of parallel ranges and valleys, trending 20° to 30° east of south and west of north.

Rising quite abruptly from the plains is a succession of mountain ranges, placed *en échelon*, so as to present an almost unbroken front to the plains from the northern to the southern boundary of the State. The northernmost of these ranges extends from near Long's Peak northward into Wyoming. This is the Laramie Range, crossed by the Union Pacific Railroad at Sherman. South of this, and in a manner a continuation of it, is the great Colorado or Front Range, which overlooks the plains from Long's Peak southward to the debouchure of the Arkansas from the mountains, ending abruptly with the great mass of Pike's Peak. Many of its peaks are above 14,000 feet in height. Farther southward the front rank of the Rocky Mountains is held by the Sangre de Cristo Range, with, for a few miles, the Wet or Greenhorn Mountains as a skirmish line.

West of these ranges lies a succession (from north to south) of high, broad mountain valleys, separated from one another by groups of eruptive mountains or masses of hills. These valleys are known as the North, Middle, South, and San Luis Parks.

Beyond these valleys is another succession of ranges. The most northern, known as the Park range, forms the western wall of the North, Middle, and South Parks; and, west of the first two of them, it is the last range; the country further westward consisting of a succession of broken plateaux, going down step by step to the valley of Green river.

West of the South Park, beyond the Park Range, lies the valley of the Upper Arkansas, in which is the extreme head of

that long river. Around the southern end of the Park Range, through the broken hills which succeed it, this river finds its way to the plains. Beyond the Arkansas rise the massive peaks of the Sawatch Range, from 14,000 to 14,400 feet in height; and these are followed by the parallel ranges and irregular masses of the Elk Mountains.

The San Luis Valley, or Park, is limited on the west by the great mass of the San Juan Mountains, an immense, rugged nucleus, from which radiate, in all directions, long, heavy spurs, like the arms of the octopus. West of this group and the Elk Mountains, a broad expanse of desert plateaux, arid and waterless, stretches, farther than the eye can reach, toward the setting sun.

The climate of Colorado is very similar to that of the neighboring Territories, modified, however, to some extent by differences in latitude, elevation, and local topography. The latter cause, also, induces very great differences in climate in different localities. In general, it is characterized by great aridity of the atmosphere, slight rainfall, and that in sudden, short showers, during which it seems as if the heavens were opened; by extremes in temperature, very low in winter and high in summer, hot in the day and cold at night; and by very sudden and great changes. The direct heat of the sun's rays is great. Very high winds and dust storms are frequent. The prevailing winds are from the Northwest and West.

The regular succession of the seasons is often very much disturbed—indeed, unseasonable weather may almost be said to be the rule, rather than the exception. Summer often extends to Christmas time; and winter not only "lingers in the lap of spring," but occasionally even crowds her out of place entirely.

The extreme aridity of the atmosphere may be illustrated by a few facts, well known to many people: The grass cures standing; meat, exposed to the sun and air, does not putrefy, but dries up. The snows of winter melt only in small part, the major part evaporating directly without going through the preliminary process of liquefying. Indeed, this process of direct evaporation goes on at temperatures considerably below the melting point of ice.

On the human system the effects are equally characteristic. The hair becomes dry and crisp; the lips and even the skin of the hands crack and bleed. Perspiration, unless excessive, is

imperceptible—and it may be added, that the heat, though often of a degree that would be unbearable in the moist Eastern climate, is almost unfelt. I have at times journeyed on horseback, day after day, in the full blaze of the sun, when the temperature in the shade was 104° Fahr., without the slightest inconvenience.

The following table* gives, in inches, the mean monthly and annual rainfall at a number of stations in this State:

	Fort Kamachmatte.	Fort Garland.	Fort Lyon.	Fort Morgan.	Montgomery.	Mountain City.	Golden City.	Denver.	Colorado Springs.	Cheyenne, Wyo.
Latitude	37° 32′	37° 35′	38° 08′	40° 15′	39° 00′	39° 32′	39° 45′	39° 45′	38° 18′	41° 18′
Longitude	105° 32′	105° 40′	103° 50′	103° 48′	105° 00′	105° 40′	105° 20′	105° 04′	104° 08′	104° 48′
Height, feet	8,365	7,945	3,795	4,500	10,788	.....	5,739	5,344	6,089	6,075
January	.54	.11	.22	.12	4.55	.....	.....	.39	.15	.09
February	.95	.21	.12	.....	1.00	.25	.....	.30	.37	.04
March	.61	.23	.16	.....	3.70	.27	.....	.84	.57	.55
April	1.25	.34	2.09	.....	5.26	.60	.....	1.76	2.08	.59
May	1.19	.33	4.64	2.55	11.75	.....	5.40	3.09	4.87	2.14
June	.71	.77	1.40	.75	.....	.....	3.50	1.58	1.04	1.07
July	2.01	1.29	2.58	.58	.....	.....	3.94	2.23	2.44	2.43
August	2.04	1.27	.27	.60	.....	.....	.50	1.35	1.10	1.54
September	1.80	.76	.04	.....	.....	.....	2.20	1.71	1.67	.66
October	.97	.33	.....	.19	.....	4.00	.....	.54	.15	.44
November	2.61	.94	.07	.....	.....	3.30	.....	.71	1.19	.35
December	1.07	.15	.15	.....	2.10	.....	.....	.47	.29	.09
Spring	2.95	1.00	7.09	.....	20.99	.....	.....	6.54	7.87	3.28
Summer	5.56	3.35	4.30	1.85	.....	.....	7.94	6.19	5.56	5.09
Autumn	4.35	1.33	.11	.....	.....	.....	.....	2.95	3.19	1.77
Winter	2.27	.45	.50	.....	.....	.....	.....	1.15	.81	.18
Year	17.06	6.11	12.09	.....	.....	.....	.....	16.84	17.15	10.30

Proceeding westward over the plains from the Eastern boundary of the State, the rainfall decreases markedly in amount and becomes more variable in character as far as the base of the mountains. Entering the mountains, the precipitation increases in quantity very much, but without changing its character. The winter precipitation is husbanded, in the mountains, in the form of snow, which, in the late spring and summer, melts, and, swelling the streams, is utilized for irrigation. The mountains thus play, to a certain extent, the part of reservoirs.

Farther west, on the lower plateaux, the rainfall is reduced to a minimum, and the country has all the aspects of a desert.

The following table† shows the monthly and annual mean temperatures at a number of stations in the State:

* Hayden's Annual Report, 1876, p. 315. † *Id.*, p. 316.

	Cheyenne, Wyo.	Denver.	Colorado Springs.	Fort Lyon.	Fort Morgan.	Fort Reynolds.	Fort Sedgwick.	Canon City.	Fair Play.
Latitude	.....	39° 45′	38° 50′	38° 09′	40° 15′	39° 15′	40° 38′	38° 28′	39° 13′
Longitude	.....	105° 00′	104° 49′	103° 36′	103° 48′	104° 12′	102° 28′	105° 15′	106° 00′
Elevation, feet	6,100	5,350	6,032	4,735	4,500	4,900	3,800	5,400	9,994
January	26.6	26.57	28.2	26.01	19.78	22.26	25.28	24.2	20 0
February	30.7	32.75	32.9	33.65	33.07	36.22	31.60	34.6	21.8
March	36.6	31.85	33.5	39.68	30.82	41.07	34.65	36.4	19.5
April	42.4	46.90	45.5	49.72	47.20	51.73	46.35	45.5	33.8
May	50.6	60.59	54.9	64.74	58.25	63.13	59.49	.....	44.0
June	60.8	67.13	64.0	74.80	71.00	72.50	70.88	.....	57.4
July	64.0	72.48	64.6	79.65	78.99	78.79	78.81	.....	57.0
August	62.2	67.70	65.2	78.13	79.85	73.94	72.31	.....	56.0
September	56.0	61.28	57.0	64.33	70.65	64.38	60.62	.....	49.1
October	47.9	48.78	51.3	49.08	57.41	50.98	49.68	.....	.....
November	39.3	39.32	37.1	39.08	.....	39.78	40.20	.....	.....
December	33.4	32.45	35.4	27.97	29.51	27.08	28.51	26.6	25.1
Year	44.1	46.13	47.8	52.09	.....	52.70	49.99	.....	.....

	Parrott City.	White River Agency.	Los Pinos Agency.	Montgomery.	Golden City.	Fort Garland.	Central City.	Pike's Peak.	Mount Lincoln.
Latitude	37° 22′	39° 58′	38° 12′	39° 00′	39° 44′	37° 32′	39° 48′	38° 50′	39° 21′
Longitude	108° 08′	107° 48′	108° 50′	108° 00′	105° 13′	105° 40′	105° 30′	105° 02′	106° 09′
Elevation, feet	8,633	6,491	9,200	10,788	5,739	7,945	8,200	14,147	14,200
January	.....	21.8	.....	17.86	.....	18.46	24.05	2.1	6.0
February	.....	26.2	.....	24.45	.....	23.37	.....	4.5	.....
March	.....	28.6	.....	19.78	.....	33.63	.....	4.5	.....
April	.....	41.0	.....	29.75	40.77	42.75	38.58	14.9	.....
May	.....	54.7	.....	41.98	61.00	59.41	49.97	21.4	.....
June	.....	64.4	.....	.....	67.57	62.23	62.73	31.0	.....
July	.....	63.9	.....	.....	73.35	66.61	67.90	35.7	45.0
August	.....	64.8	55.8	.....	74 73	64.84	.....	35.9	43.0
September	.....	58.3	46.2	.....	65.80	55.61	50.38	29.1	36.0
October	.....	49.0	.....	.....	.....	43.97	.....	25.0	26.0
November	.....	35.6	.....	.....	.....	30.88	35.88	10.8	18.0
December	.....	26.8	.....	19.58	.....	20.05	37.30	9.7	15.0
Year	.....	44.6	.....	.....	.....	42.86	.....	19.0	.....

At only nine of the eighteen stations here named do the observations cover the entire year. Of these White River Agency, Col., shows nearly the same annual mean temperature as Cheyenne, Wyo.; and Fort Lyon almost the same as Fort Sedgwick, the slight differences corresponding nearly to the ratio of the differences of altitude. But Colorado Springs, although 782 feet higher than Denver, shows a mean temperature but one-third of a degree lower. The highest mean temperature is that of Fort Reynolds, 52.7° (although this station is 700 feet above Sedgwick, with an average of 49.92°). Such differences are due chiefly to conditions of exposure.

The following table* shows the monthly and annual mean relative humidities at a few stations:

Months.	Cheyenne, Wyo.	Colorado Springs.	Denver.	Dodge City, Kan.	North Platte, Neb.	Santa Fe, N. Mex.	White River Agency, Colo.	Cañon City, Colo.	Fort Lyon, Colo.	Fair Play, Colo.
January	69.5	69.7	54.3	69.8	70.0	51.1	.....	44	.....	.....
February	63.3	73.4	46.6	73.3	72.7	48.4	.....	38	.....	.....
March	69.6	58.5	48.4	59.8	61.4	36.9	.....	40	.....	.....
April	60.6	58.6	46.8	63.0	66.3	34.1	.....	.....	.....	.....
May	49.5	45.3	38.4	49.7	50.6	25.3	51	.....	.....	.....
June	32.7	42.8	29.0	55.5	50.7	19.8	50	.....	.....	.....
July	50.4	48.8	35.7	57.1	66.4	24.9	60	.....	59	68
August	52.0	53.4	42.7	66.6	59.3	43.8	56	.....	57	61
September	57.3	64.4	51.3	62.7	63.0	34.1	62	.....	.....	44
October	40.4	48.0	33.5	54.9	55.4	29.7	54	.....	.....	.....
November	62.9	55.9	59.8	53.0	67.8	34.1	68	42	.....	.....
December	51.4	44.9	43.8	58.4	64.3	47.7	73	50	.....	.....
Year	54.3	58.4	45.3	61.8	63.3	40.7	.....	.....	.....	.....

"Of these stations, Cheyenne, Denver, Colorado Springs, Forts Lyon, Morgan, Reynolds, and Sedgwick, are situated in the plains; Cheyenne, Denver, and Colorado Springs are, however, within a very few miles of the foot-hills; Cañon City is in a well-sheltered bay in the mountains, but open to the plains. Its temperature is abnormally high. Of the other stations, Golden City is immediately under the foot-hills; Fair Play, Los Pinos agency, Montgomery, Fort Garland, Central City, Mount Lincoln, and Pike's Peak are in the mountains. Parrott City is at the southwest foot of the San Juan Group, while the White River agency is in the plateau region."

"Of the mountain stations, Fair Play is situated in the northwestern corner of South Park, under high mountains on the north and west. Montgomery is at the extreme head of the South Platte, about twelve miles north of the latter station, in a closely encircled mountain valley. The Los Pinos agency is in a broken country, between the Sawatch and San Juan Ranges. Fort Garland is situated on the eastern side of San Luis Valley, with high mountains on the north and east. Central City is in a narrow mountain valley. Pike's Peak and Mount Lincoln are among the highest peaks in the State." *

The general flora of the State is simple, and is distributed according to well-defined laws. The mountains and higher

* From Hayden's Annual Report, 1878, p. 317.

plateaux are covered with forests. In general, the valleys and plains are bare of timber, but produce nutritious grasses. A few of the higher valleys, especially if in close proximity to mountain ranges, are clothed in forests. Tree growth seems to be almost purely a question of elevation, or, what is here the same thing, of temperature and moisture.

While the various species of bunch grasses are the peculiar growth of the valleys and plains in the more arid regions, sage-brush (*artemisia*), cacti, of a number of species, and the yucca (or Spanish bayonet), usurp its place to a greater or less extent. The lower timber on the mountains usually consists of quaking aspen (*populus tremuloides*), a tree of no value except as furnishing a very indifferent firewood. Above this, and extending to the timber line, which in this State is at 11,000 to 12,000 feet above the sea, are found spruce, fir, and pine forests. The timber is of good quality for almost all purposes, excepting those for which hard wood is needed, and is of incalculable value to the people of the State. The more arid plateaux and valleys of the western part of the State support a growth of piñon pine and dwarf cedar, both species peculiar to this arid region. They are of no economical importance, except as fuel. In the river bottoms everywhere, are groves of cottonwoods and willows, which in some localities grow to an astonishing size. The only hard wood in the State is a species of scrub oak, which grows to a height of but ten or twelve feet. This is distributed commonly upon the base of the mountains, and over the lower foot-hills.

Out of the total area of the State—after excepting seven per cent., or 7,323 square miles, which is the estimated area of tillable land—52.6 per cent., or 55,000 square miles, has been estimated as being valuable as grazing land. The area covered by valuable coniferous forests is 19.1 per cent., or 20,000 square miles. That covered by inferior timber, such as quaking aspen, piñon pine, and cedar, is 13,500 square miles, or thirteen per cent.; while 6.3 per cent., or 6,535 square miles, may be classed, for all industrial purposes, as barren and irreclaimable. But very little of the land at present covered by forests can, under any circumstances, be utilized for agriculture or grazing, except that in river bottoms occupied now by willows and cottonwoods; and, therefore, the destruction of the forests can lead to no useful results. But, while large amounts of timber are annually

used in the State, still the depletion of the forests probably goes on no faster than it did when the country was occupied by Indians. Forest fires then were frequent, arising either from carelessness, or intention, in efforts to drive out game. One such fire might, and often did, destroy more timber in a few hours than a whole mining district would use for years. As the forests appear to have held their own in past times, there seems no present cause for alarm regarding the supply of timber in the State at large.

It is impossible to obtain, at present, any figures regarding the amount of timber used. The abundant supplies of coal which have been discovered in various parts of the State, have reduced the consumption of wood, as a fuel, to a minimum.

The fauna of Colorado is very varied, corresponding with the surface of the country. Excepting in the unsettled regions, game is becoming very scarce. In the mountain regions, elk (wapiti), the mule and the white-tailed deer, the mountain sheep (*ovis montana*), and the antelope, or prong-horn (in the summer), are the principal ruminants. The grizzly, cinnamon, and black bear are not unfrequently met. The coyote, a small prairie wolf, is abundant; and the large gray wolf, the wild-cat, the wolverine, the North American panther, or cougar, and the red fox, are occasionally seen.

In the winter, all the ruminants above mentioned migrate to the plains, where they join the bison on his peculiar range. The characteristic animals of the plains are the bison, now fast disappearing, the antelope, and the prairie dog. The communities of the latter curious little rodent, with his constant companions, the small owl and the rattlesnakes, are very characteristic of the plains of North America. Coyotes, and gray wolves too, here find their natural habitat.

On the lower plateaux, the fauna is as plainly indicative of the climate as the flora. Large quadrupeds are unknown. Maj. Powell's description* of the animal life of this region is as true as it is vivid. "On the lower terraces rattlesnakes crawl, lizards glide over the rocks, tarantulas stagger about, and red ants build their play-house mountains. Sometimes rabbits are seen, and wolves prowl in their quest; but the desert has no bird of sweet song, and no beast of noble mien."

Among birds, the blue, pinnated and ruffed grouse, and the sage hen, are abundant throughout the plains and mountains.

* Report on Exploration of Colorado River, p. 175.

In the Alpine regions, the ptarmigan is plentiful. Eagles and various species of hawks, magpies, ravens and crows, and two or three species of jays, are seen everywhere. The avifauna of the State is abundant and varied, but by no means characteristic.

Agriculture is everywhere dependent upon irrigation, and, ultimately, will in many localities be directly proportional to the amount of water available in the streams. At present but very few of the streams, even under the prevailing wasteful system, or want of system, in irrigation, are used up to their full capacity. An estimate, made by members of Dr. Hayden's survey, from the best data which could be collected during the survey of the State, gave 7,323 square miles, or seven per cent. of the area of the State, as the total amount of irrigable land. This estimate was based on the amount of land suitably situated for irrigation, and on the amount of water flowing in the streams during the months when irrigation is needed. By storing the water from the spring floods in reservoirs, the area may be increased to ten per cent. On the other hand, unless the methods of irrigation are greatly improved, the first amount will be found to be largely in excess. The area in the State now under cultivation in cereals, as given by the Tenth Census, is 116,042 acres.

The elevation above the sea is an important factor in judging of the agricultural capabilities of the State. This sets immovable limits to the culture of certain crops. Thus, wheat does not ripen above 7,500 feet. Barley and oats are safe crops only up to about 8,000 feet. Corn can be raised in only a few of the lowest, warmest parts of the State, such as the valleys of the Arkansas, Fontaine qui Bouille, and Rio Grande. Potatoes are not a safe crop above 9,000 feet. Turnips, peas, and the other hardy garden vegetables can be easily cultivated up to 7,500 feet, and in some localities much higher. Grapes will ripen up to 5,800 feet. These figures are subject to slight variation on account of local climate, and latitude; but in general they hold good over the State.

On the plains, the sole limit to the amount of arable land is set by the supply of water. The whole amount brought from the mountains by the South Platte and Arkansas and their branches, can be utilized to the fullest extent, and yet but a small proportion of the land bordering upon them will be brought

under cultivation. By far the larger part must remain forever the domain of the grazier. Estimates of the amount of water carried by the principal streams at the critical period of the irrigation season—i.e., near its close, when the streams are running low—have been made; but they afford but a poor indication of the capabilities of the streams, if the total annual flowage were carefully husbanded, and used to the best advantage.

The following table gives estimates, most of them based upon measurements, of the amount of water, in cubic feet per second, carried by the principal streams which water the plains, at the critical period, and the amount of land, in square miles, which can be irrigated by them, supposing that it requires three cubic feet of water per second to irrigate a square mile, the average duty usually allowed:

Streams.	Cubic Feet per Second.	Duty, Sqr. Miles.
South Platte river	2,800	933
Cache la Poudre and Box Elder creeks	522	174
Big Thompson creek	348	116
Little Thompson creek	132	44
St. Vrain's creek	522	174
Clear and Ralston creeks	702	234
Cherry creek	132	44
East Plum creek	132	44
West Plum creek	216	72
Arkansas river	2,610	870
Purgatoire river	435	145
Apishpa river	261	87
Huerfano river	261	87
Cucharas river	435	145
St. Charles and Greenhorn rivers	465	155
Fountaine qui Bouille river	435	145
Turkey creek	90	30
Beaver creek	45	15
Hardscrabble creek	111	37
Totals	10,654	3,551

Besides the above, a certain amount of land, by no means insignificant, can be irrigated by means of the minor streams and springs directly at the base of the mountains, an amount sufficient to swell the total by 1,000 square miles.

Of the streams mentioned in the above table, the South Platte, the Arkansas, and the Huerfano flow through fine valleys in the mountains, in which a portion of their water would be used, so that the above estimate is in excess; but to what

extent, it is impossible, of course, to form an estimate. It may be safely said, however, that not more than 4,500 square miles, or about ten per cent. of the area of the plains, can be brought under cultivation without the use of reservoirs.

In the larger valleys of the mountain region, as on the plains, the supply of water limits the amount of arable land. In the case of the North Park, which is drained by the North Platte, the great elevation, 7,500 to 7,700 feet, coupled with the latitude, renders agriculture, at least in the case of most crops, somewhat hazardous; and it may be dismissed as not likely to attract the attention of farmers. The Middle Park, so called, is properly a collection of valleys, separated by mountain ranges. The principal of these, such as those of Willow, Troublesome, and Muddy creeks, and Frazier, Williams, and Blue rivers, contain considerable areas of land well suited for raising the hardier cereals and vegetables. The streams traversing these valleys furnish an abundant supply of water. The total area of arable land within this park is estimated as seventy-four square miles.

The South Park lies at an elevation of 8,000 to 10,000 feet above the sea, and consequently, from its elevation, can not become of importance as an agricultural region. Still, in the lower parts, along the South Platte, there are a number of fine ranches where cereals and hardy vegetables are ripened.

The San Luis valley is much the largest of this series of parks, is situated farther south, and its elevation is much less. The latter ranges from 7,400 to 8,000 feet; and, as it is situated in the southern part of the State, the climate is quite mild. The total area is 5,300 square miles, of which the lower third lies in New Mexico. It is watered by the Rio Grande and its tributaries. The soil in the northern part is clay, which gradually changes southward into a loose sand. The streams which enter the northern part of the valley, San Luis and Saguache creeks, lose themselves in a group of stagnant lakes or sinks, opposite the debouchure of the Rio Grande, and never reach that stream. The San Juan Mountains, which limit this valley on the west, have an enormous rainfall; and consequently the Rio Grande and its western tributaries bring down large bodies of water. As there is an abundance of land favorably situated for irrigation, a considerable proportion, probably one-fourth of the part of the valley in Colorado, can be reclaimed and cultivated without reservoirs.

The San Juan river heads in the southern slopes of the San Juan Mountains. Its branches have narrow, fertile valleys, walled on both sides by high mountain ridges. The main stream has most of its course in an arid country; and, although not in cañon in that part of its course which is in Colorado, little land outside of its immediate bottoms can be irrigated by the river. The total area which can be irrigated by this stream and its branches is estimated at 392 square miles, which is distributed in small patches.

Grand river, one of the forks of the Colorado, is the largest stream in the State. On the main river, there is little irrigable land; as the course of the stream is a succession of cañons from its head, in Middle Park, to its mouth. This is caused by the stream flowing in a direction at right angles to the trend of the ranges, and hence being compelled to cut its way through them. Its main tributary, the Gunnison, has much the same character of course; but, in the alternation of ranges and valleys, it crosses two fine valleys of considerable extent. The upper one, near its head, is that in which the town of Gunnison is situated. Although at a considerable elevation (7,800 feet), still the hardier crops are cultivated with fair success there. The other is the well-known Uncompahgre valley. The Gunnison river crosses its foot, while it is traversed by the Uncompahgre river, a stream of considerable size, carrying at the critical period about 600 cubic feet of water per second. This stream is of far more importance in the irrigation of this valley than the Gunnison, as the fall of the latter is not sufficient to allow it to irrigate more than the bottom land, a strip from one to two miles in width. The volume of the Uncompahgre can be used entirely, as the surface of the valley is very level, and the river has a rapid fall. Probably about 250 square miles of the valley can be reclaimed by the two streams.

Besides the above-mentioned areas, there are, all over the mountains and plateau regions, small valleys, containing from a few hundreds of acres to a score or more of square miles, which can be reclaimed, swelling the total amount to the figures above given.

The total cereal products of this State, as given by the Census Bureau, rose from 863,871 bushels in 1869, to 2,648,573 bushels in 1879—an increase of more than 200 per cent., proportioned among the six principal crops as follows:

Crops.	1870.	1880.
Wheat	258,474	1,425,024
Rye	5,235	19,485
Oats	332,940	640,900
Indian corn	231,908	455,969
Buckwheat	178	110
Barley	35,141	107,116
Totals	863,871	2,648,573

The business of raising cattle is one of the safest and most profitable which is carried on in the State. The only risk attending it is from loss of cattle from excessively cold weather and deep snows. It requires considerable capital, however, to start with a herd sufficiently large to make it profitable. Usually, Texas cows, yearlings, and two-year-olds are purchased in the first instance. The former now cost seven to eight dollars, the latter ten to twelve dollars. These are of an inferior grade, but are crossed with blooded bulls; and the grade is thus raised year by year. Usually, no stock is sold during the first three years; after that, two and three year old steers are sent to market, while the cows are preserved.

The cattle run loose on the range, mingled with those of other owners, being known only by their brands. Annually, in May or June, comes the "round up;" when all the cattle on the ranges are collected, and those of each owner culled out; the calves, which are still with their mothers, are branded; and, after taking out such as are wanted for immediate sale, all are turned loose again for the year.

The expenses of a cattle farm are very light. Except at the time of the "round up," when a large number of men are required, but one or two men are needed to manage a large ranch. The pasturage costs nothing, as the cattle range on government land.

Sheep husbandry is even more profitable than cattle raising, and is almost as safe. It requires, however, much more care and attention. Each band, while on the range, must be constantly watched; and, for the winter, feed and shelter must be provided. On the other hand, sheep are more prolific than cattle, and mature sooner, thus yielding more immediate gains; while the yield of wool is a very important item of profit. The latter is generally estimated to pay, at least, all the expenses of keeping them.

The following estimate of the amount of live stock owned in Colorado is from the returns of the last Census: Cattle, 800,000; sheep, 1,000,000; swine, 20,000.

The plains are the great pasture of Colorado. The grasses which cover them, buffalo and gramma, are the most nutritious in the world. The quality of the pasturage, however, differs very much in different localities, ranging from the richest meadows to a comparative desert. Again, there are portions of the plains absolutely without water, even in quantity sufficient for the use of stock, which renders a portion of the area valueless. Still, by far the greater portion, probably nine-tenths, of this great region, is a valuable stock range. Anywhere in this region, stock can winter out of doors with almost absolute safety.

Besides the plains, there are many large valleys in the mountains which are also well suited for stock ranges. The North, Middle, and South Parks, and the San Luis valley now support large herds of cattle and flocks of sheep. The thousands of small valleys scattered among the mountains, the lower, bare slopes of the mountains, and such of the high plateaux as are not covered by forests, add immensely to the grazing area of the State.

The geology of the region of the plains is very simple. With the exception of areas of Tertiary formation in the extreme northern part, and on the Arkansas divide, the whole region is Cretaceous or Post-Cretaceous. The latter formation appears along the course of the South Platte, below Greeley, and in a broad belt, 60 to 80 miles in width, on both sides of the Arkansas, extending from the mountains to the east boundary of the State. At the base of the mountains, the strata are upturned, forming "hogbacks," in which Post-Cretaceous and Jura Trias are exposed. In the latter formation, at the base of the mountains, numerous seams of coal have been discovered and worked, which now furnish a supply of that combustible to the State.

The geology of the mountain region is as complex as that of the plains is simple. All the formations are represented. The Colorado, nearly all of the Park, all the Sawatch and Wet, and a portion of the Sangre de Cristo Range, are of granite and allied metamorphic rocks. The southern portion of the Park Range is Carboniferous and Silurian. Portions of the Sangre de

Cristo Range are Carboniferous; while here and there an intrusion of volcanic rocks makes its appearance. The San Juan mountains are volcanic, with an area of quartzite peaks in the midst. This range is flanked on the south by an area Carboniferous and Cretaceous in character. The Elk Mountains are a medley of volcanic peaks, interspersed among Silurian and Carboniferous, and flanked by Cretaceous, areas.

North and Middle Parks are floored with the Tertiary formation, through which have burst up mountains of volcanic rock. South Park presents too varied a grouping of formations to attempt to sketch. San Luis valley is buried deep in the most recent formations.

The high plateaux about the head of White river are capped with volcanic rocks, below which, on the north, west, and south, is found every formation down to the Tertiary. Thence westward to the boundary of the State, and northward from the crest of the Book Cliffs, the plateaux are of the Tertiary formation, with the exception of that portion of the Uinta Mountains which projects into the State. The latter consist of rocks of the Cretaceous, Jura Trias, Carboniferous, and Silurian ages. South of the crest of the Book Cliffs, the plateaux are mainly Cretaceous. Within the bend of the Grand river, about the Sierra La Sal, and in certain other limited localities, the Jura Trias comes to the surface; and, in the cañons of the Grand and Dolores, even the Carboniferous is exposed in narrow belts. In several places in this plateau region, small groups of igneous mountains have been uplifted through the sedimentary rocks. South of the San Juan Mountains, on the San Juan and its tributaries, is a large area of the Tertiary formation, enclosed with the Cretaceous beds.

The mining of the precious metals is to-day, and probably will continue to be, the principal interest of the State, and the one upon which its prosperity will mainly depend. In the last three years its population has more than doubled, and its wealth has increased manifold, owing to the development of this interest. The precious metals have been found in nearly all parts of the mountain region of the State, in many varied forms of combination, and in every form of occurrence, including placers, fissure veins, contact veins, segregated deposits, pockets, and in anomalous forms which defy the classification of the books.

The first mines worked in the State were naturally the placers. These were soon exhausted; but quite recently attempts have been made, with the hydraulic system, to rework the old diggings, and with some degree of success. The first vein mining of importance was in the neighborhood of Central City, Black Hawk, and Georgetown. The localities may be better defined as being located on the north and the south forks of Clear Creek. In the first locality the metal is gold. The ore is principally iron and copper pyrites, which are the most refractory of ores. They were not worked to advantage until the introduction of the Swansea process, since which the mines have returned a profit. On the south fork of Clear Creek, the metal is silver, and the ore mainly galena. The deposits are fissure veins. At many localities in the Colorado range are mines of a similar character to the two above mentioned. In the neighborhood of Boulder City deposits of ore containing tellurium and other rare metals have been discovered; but, economically, they seem to have proved a failure.

In the mountains on the northwestern border of South Park, much mining has been done, but without profit, except in the case of a group of mines on Mounts Lincoln and Bross, where silver has been extracted profitably from galena ores. But the results of the great discoveries in and about Leadville eclipse all other mining in the State. They consist of a contact vein of carbonate of lead, with more or less galena, and chloride of silver. The deposit is overlaid by an intrusion of trachyte; and the foot-wall is limestone, probably of the Carboniferous age. It is "pockety," swelling into lenticular masses, and then, perhaps, pinching out entirely. The mines are at the base and on the slope of a series of high hills, foot-hills of the Park Range, into which the beds dip at an angle of about twenty degrees. With perhaps one or two exceptions, no outcrop has been discovered, owing, doubtless, to the soft, friable nature of the ore. Discoveries have been made by sinking shafts at points presumed to be above the ore bed. In this way it has been traced for a distance, north and south, of ten or twelve miles. Countless claims have been staked out, and numberless shafts have been sunken, while comparatively but few claims have proved really valuable. The production, however, in the short time which these mines have been worked, has been marvelous.

Custer county is the scene of another great discovery, which was made a few months later than that at Leadville. The deposits here seem to have the form of chimneys, as though the crater of an old volcano had been filled up loosely with boulders, ashes, and other mountain debris, and then the whole mass filled in and cemented by the ore. The deposits are enormous in extent; but the ore varies greatly in quality. This district has not yet been developed very extensively; but there are a number of mines which are already paying heavily.

The silver deposits in the San Juan Mountains were discovered many years ago; but it was not until 1873, when the Utes relinquished their title to these mountains, that it was possible to work them. The whole range is metalliferous, veins of ore having been discovered in all parts. The deposits probably resemble the ideal "true fissure vein" as closely as any known. Transportation has heretofore been difficult; for everything has required to be packed in and out on the backs of mules a hundred miles to and from the railroad; therefore, although hundreds of claims have been filed, very few of the mines have done more work than sufficient to secure their property. At this writing, however, the railroad has just reached Baker's Park, in the heart of this region; and development will go on rapidly.

Since the Leadville excitement, the rush has been to the Elk Mountains. In this new El Dorado, 30,000 men have been mining, prospecting, and trading during the summer of 1880. That rugged group of mountains has been thoroughly examined for precious metals: such an army of prospectors would leave no stone unturned. As a net result, we see an amount of work laid out for capital and labor, in the form of undeveloped mining claims, that is perfectly appalling. Little has been done on any mines west of the Sawatch Range, because of the difficulty of transportation, and poor smelting facilities.

The above comprise the leading mining districts. But, besides these, there are thousands of mines scattered over the State. The Sawatch Range contains several promising camps; and the Park Range, besides containing the Leadville and Mount Lincoln districts, is literally honeycombed with prospect holes.

On the whole, the mining interests of Colorado, despite the fact that some of its deposits have been worked for nearly twenty years, are yet in their infancy. There is an immense number

of valuable properties lying practically untouched for want of capital. It is truly an *embarras de richesses*. On the other hand, an immense amount of capital has been sunken in unprofitable schemes, many of which were but too plainly worthless to any one who would take the trouble to examine them. It is a singular phase of human nature which prompts one to put money blindly into investments, that at the best, and with the fullest possible knowledge, are more or less uncertain; and these cases of foolish and careless investment, with their natural consequences, do more to retard the development of the mining interests of the West than any other cause.

It is extremely difficult to obtain full and accurate figures regarding the production of precious metals in the Western States and Territories. The following exhibits, which are from the reports of Wells, Fargo & Co., approximate the true amount produced in 1879 and 1880 in this State:

Product for 1879.		Product for 1880.	
Gold dust and bullion	$ 3,459,166	Gold dust and bullion	$ 2,278,989
Silver bullion	1,504,349	Silver bullion	1,706,000
Ore and base bullion	9,380,000	Ore and base bullion	17,300,000
Total	$14,413,515	Total	$21,284,989

This is an increase over the production in 1878, of over $8,000,000, the principal part of which is from the Leadville district. The product for 1880 exceeds that for 1879 by nearly seven millions.

Besides its precious metals, Colorado possesses large deposits of iron, copper, lead, and coal. A large proportion of the area of the plains in the State is underlaid by the Cretaceous or Tertiary beds, in which this coal is found. These outcrop along the base of the mountains; and in many places beds of workable thickness have been discovered and are being worked. At present, the coal supply of Colorado, Eastern Wyoming, and much of New Mexico, is from these mines. The coal, like the Tertiary coal everywhere throughout the West, is lignitic and friable. While suited for most economic purposes, it will not answer for many classes of smelting operations.

In 1879, the total production of coal in Colorado was 400,000 tons; worth, on an average, about five dollars per ton. The mines near Cañon City produced 78,000 tons; those at El Mora, 34,000 tons; and those at Walsenburgh, 10,000 tons.

The population of Colorado, according to the Census of 1880, is 194,649, an increase of nearly 400 per cent over that in 1870, when it reached but 39,864. The present population by counties, is as follows:

Arapahoe	58,645	Huerfano	4,124
Bent	1,654	Jefferson	6,810
Boulder	9,746	Lake	23,814
Chaffee	6,510	La Plata	1,110
Clear Creek	7,846	Larimer	4,892
Conejos	5,605	Las Animas	8,904
Costilla	2,879	Ouray	2,670
Custer	8,082	Park	3,970
Douglas	2,486	Pueblo	7,615
Elbert	1,709	Rio Grande	1,944
El Paso	7,952	Routt	140
Fremont	4,735	Saguache	1,973
Gilpin	6,489	San Juan	1,087
Grand	417	Summit	5,459
Gunnison	8,237	Weld	5,646
Hinsdale	1,499		

Of the total population, 129,471 were males; 65,178, females; 154,869 were native; and 39,780, foreign born. This population is in great measure a floating one, migrating from point to point, as new fields of mining discovery are opened. The principal cities are: Denver, the capital and metropolis of Colorado, situated on the South Platte, ten miles from the base of the mountains, with a population of 35,630; Leadville, in the Arkansas valley, with a population of 14,820; Central City and Black Hawk, on North Clear Creek, in the oldest gold mining region; Georgetown, on South Clear Creek, the scene of some of the earliest silver mining; Colorado Springs, on the Fontaine qui Bouille, a colony town, founded by the Denver & Rio Grande Railroad Co.; Pueblo, on the Arkansas river, forty miles from the base of the mountains; Silver Cliff, in the Wet Mountain valley; and Golden City, just west of Denver, at the very base of the mountains.

There were in the State in 1880, fourteen national banks, with a capital of $1,295,000; seven State banks and trust companies, with a capital of $259,250, and over half a million in deposits; and thirty-one private bankers, representing a total capital of $325,667.

In 1870, there was not a mile of railroad in use in the State; in 1880, there were no less than 1,208, of which 753 miles were ordinary gauge, and 458 narrow gauge. These represented a total capital of about $56,000,000. At the close of the year 1880, the number of miles constructed had increased to 1,531. The

developments in mining are creating necessities for ample and rapid transportation to distant points; and these necessities are being supplied with an energy and enterprise that is truly wonderful. The mountainous nature of the country has been overcome by the originality and fertility of resources of the engineers; so that it seems that a railroad can be built almost anywhere. There is no longer a limit to grades or radii of curves; for railroads have been built up mountain slopes and over passes heretofore impassable to any being without wings. The railroad up the gorge of the Arkansas is suspended, for miles, from the cliffs on the sides—a longitudinal bridge.

The State has an excellent school system, supported mainly by direct taxation. The law provides that a county tax of not less than two nor more than five mills on the dollar, shall be assessed for school purposes. In addition, there are the proceeds from the sale of school lands, which, however, in this State amount to but little, and the proceeds of fines, etc. The officers of the system are: The State Superintendent of Public Instruction, a county superintendent in each county, and a district board in each school district. The State Superintendent, the Secretary of State, and the Attorney General constitute a State board. In cities and towns, schools are maintained from 120 to 200 days in the year; in the rural districts, from 60 to 120; and in some districts, 200 days. Besides the common schools, the State supports a University, located at Boulder, an Agricultural College at Fort Collins, and a School of Mines at Golden City—all of which are in flourishing condition. The following statistics regarding the school system are from the report of the State Superintendent for 1880:

Number of school districts	414
Total school population	35,566
Total number enrolled	22,119
Average daily attendance	12,618
Number of school houses	292
Value of school houses and property	$682,410
Total number of teachers	678
Income	$522,581
Expenditures	$395,231

The financial condition of the State is excellent. From the report of Gov. J. L. Routt, at the close of the year 1878, the following statement is made up:

Total outstanding debt	$172,060.[illegible]
Amount of revenue due, but not paid	178,529.[illegible]
Balance	4,468.89

Gov. Routt remarks: "For a new State, this is unprecedented; and that its credit is good is shown by the fact, that State warrants, which less than two years ago were selling for seventy-five cents on the dollar, are now one per cent. above par." The total assessment of all property for 1878 was $43,072,648. This is probably about one-third of the true valuation of the State, i. e., about $120,000,000, of which the city of Denver alone probably made up one-third. Since 1878, the valuation of the State has increased enormously. The greater proportion of this increase has been in the mining regions (where the value of property is to a large extent hypothetical); while the cities and towns have likewise contributed a large quota. Below will be found an interesting statement showing the assessed valuation of property and the indebtedness of the principal cities of Colorado in 1880, as reported by the Tenth Census:

Towns of Less than 7,000 Inhabitants.	Assessed Valuation in 1880.	Total Indebtedness in 1880.
Alma	$ 60,000	.....
Animas City	63,653	.....
Black Hawk City	547,320	$ 7,352
Boulder	903,245	68,000
Central City	995,534	8,233
Colorado Springs	1,560,000	87,300
Crested Butte	262,005	.....
Del Norte	172,500	10,000
Evans	80,000	.....
Georgetown	1,103,458	4,000
Golden City	700,000	62,000
Greeley	501,880	1,500
Gunnison	250,000	.....
Idaho Springs	250,000	.....
Kokomo	700,000	.....
Lake City	225,905	5,500
Longmont	203,070	689
Manitou	209,000	.....
Nevadaville	350,000	.....
Ouray	156,873	1,000
Saguache	124,853	515
Pueblo	1,083,482	130,000
Silver Cliff	230,000	4,436
South Pueblo	443,255	13,000
Trinidad	750,000	.....
Totals	$12,025,553	$408,525

Finally, I show the population in 1860, 1870, and 1880, of the two cities of 7,500 inhabitants and upwards, the total assessed value and the estimated true value of real and personal property in 1880, the total tax levy, and the total debt:

Cities.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Total Ass'm'd Value of Real Estate and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of Real Estate and Person'l Property.	Taxation. Total Levy	Total Debt.
Denver.....	4,749	4,759	35,630	$18,194,092	$25,959,845	$34,658,864	$207,276	$ 20,000
Leadville.....	None.	None.	14,820	2,433,327	3,256,213	5,002,949	29,385	112,000
Totals.....	4,749	4,759	49,450	$18,627,419	$26,241,680	$37,655,813	$236,613	$132,000

When Colorado was first settled, the mountain region was occupied almost exclusively by Indians of the Ute nation, while the plains were a debatable ground between this tribe, the Cheyennes, Arapahoes, and Dakotas. The progress of settlement has swept all these warring factions from the plains, and has crowded the Utes back, across the mountains, into the plateau region. Cession after cession of land has this tribe made to the whites; and still the cry goes up, "The Utes must go." There is reason in it. These Indians, numbering about 3,700, hold 11,724,800 acres—18,320 square miles—or more than one-sixth of the State. This is about five square miles for every man, woman, and child in the Ute nation. A large proportion of it is valuable agricultural land; another large part is reputed to contain mineral deposits; while most of the remainder is useful for grazing, or for its forests. The Indians make no use whatever of it. Fed and clothed by our paternal government, why should they turn the hand to the plow? The streams run to waste; the rich soil remains untilled; the rich ores and the coal lie undisturbed in mother earth. The parable of the talents teaches us that all good gifts should be the possession of those who will use them to the best advantage; and certainly this desirable end will never be attained by leaving this land in the hands of these Indians, who are among the laziest and least progressive of any on the continent. Efforts have been in operation for the past twenty-five years, under our mistaken policy, to civilize them, with the net result of a decided backward movement. Under the system of free food and clothing, they have given up the little indigenous civilization they once possessed, without imbibing anything from the whites but their vices.

CHAPTER XV.

TERRITORY OF DAKOTA.

LYING partly within the humid, partly within the arid, region, this Territory presents us with the greatest diversities and contrasts of climate and of industries. The northeastern corner, comprising mainly the Red River valley, and the southeastern corner, which consists of the valleys of the Missouri, Big Sioux, and James rivers, are, *par excellence*, agricultural regions. The soil is rich, the climate sufficiently moist, and not too severe, for the cultivation of cereals. The western half of the Territory is within the arid region, and can never assume prominence as a bread-producing area; although as a grazing field it is probably destined to prove of great value. The southwestern part is occupied by the Black Hills, which are now, and will probably continue to be, large producers of the precious metals.

Dakota is limited on the north by the 49th parallel of latitude, on the east by Red river, the meridian of 96° 25′, and the Big Sioux river; on the south by the Niobrara and Keya Paha rivers and the parallel of 43°, and on the west by the 27th meridian west of Washington.* Its neighbors are, on the north, the British Possessions; on the east, Minnesota and Iowa; on the south, Nebraska; and on the west, Wyoming and Montana. Its area is 149,100 square miles. It is the third in size of the political divisions of the country, Texas and California only ranking above it. It is twice as large as the entire Kingdom of Great Britain and Ireland, and larger than the Republic of France. Were it settled as densely as Holland, it would contain half the present population of the United States.

Originally a part of the Louisiana purchase, it was organized first as a portion of the old Missouri Territory. It was set off by itself, with a Territorial organization, in 1861, and then included a portion of what is now Wyoming, and all of the plains portion of Montana. In 1863 the latter was taken from it, to form

* Or the 104th meridian west of Greenwich, nearly.

the original Territory of Idaho; and in 1868 the present Territory of Wyoming was formed, cutting Dakota down to its present limits. Previous to settlement, this Territory was the range of several bands of Sioux, or Dakota, Indians. Other tribes, as the Poncas and Omahas, occupied portions of the country for brief periods; but they were soon driven out by their more powerful neighbors. It has been the theatre of several very active campaigns against the Dakotas, notably that which followed the Minnesota massacre, in 1862. In that year and the one following, the eastern branch of the Dakota nation was thoroughly whipped in several fights, by United States troops under Generals Sibley and Sully. The progress of settlement has been very slow until within the last four years. Ten years ago, in 1870, practically the only settlements were in the south-eastern corner, where they had progressed gradually from Iowa. Latterly, however, the course of settlement has been from three different directions, and has been extremely rapid: first, from Iowa and Nebraska, working up the Missouri into the south-eastern corner; second, over into and beyond the Red River valley, and along the Northern Pacific Railroad, in the north-eastern quarter; while, third, the discovery of gold in the Black Hills has brought a swarm of gold hunters from the south. The effect of this triple immigration is shown in the growth of the Territory from 14,181 in 1870, to more than 135,000 in 1880—a tremendous rate of increase, and one predicting a great and powerful State in time to come.

With the exception of the Black Hills, Dakota contains no mountainous country; and its surface is comparatively level. Its average height above sea level is estimated at 1,950 feet. The lowest part is about 1,200 feet; 78,000 square miles are estimated to be between 1,000 and 2,000 feet above the sea; and 62,600 between 2,000 and 3,000 feet. The remainder, all of which is comprised within the Black Hills region, ranges from 3,000 to 7,000 feet above the sea. Almost the whole area of the Territory lies between 1,500 and 2,500 feet elevation.

The Territory is cut into nearly equal parts by the Missouri river, which crosses it diagonally from northwest to southeast. East of the river the country consists mainly of elevated table lands, the Coteaus du Missouri and des Prairies. The former, which is the most western, comes down in a long tongue from the British Possessions, occupying the space between the Mis-

souri and the James rivers. On the north, it is slightly above 2,000 feet above the sea, with a gradual descent southward. Its surface is somewhat uneven and broken, with numerous "sinks" and ponds of alkaline water. Vegetation is scanty; and of timber there is practically none. The other plateau lies east of the James river, extending over into Western Minnesota. Its elevation is slightly less than that of the Missouri Coteau; but its surface resembles very closely that of the latter in its sinks and alkaline lakes. The vegetation is rather more abundant; with a marked increase of timber. In general, these coteaus are limited sharply by lines of bluffs. Devil's Lake, a large sheet of salt water, having no outlet, is the principal one of the many lakes which dot these coteaus.

In the northeast the Coteau des Prairies breaks down to the valley of the Red River of the North, so called to distinguish it from the Red river of Louisiana. This valley has become, within two or three years, one of the greatest wheat-producing regions of the Northwest. Southward the coteau sinks gradually to the fertile country near the Missouri.

West of that river, the country as a whole assumes a more forbidding aspect. On the lower course of the Little Missouri and the Lower Yellowstone, much of the country is what is known as "Bad Lands." This is the worst section. Aside from it, the whole region resembles the rest of the Great Plains, of which it forms a part. The surface is level or gently rolling. There is no timber excepting in very narrow belts along the streams. The vegetation is mainly bunch grass. As we progress southeastward, however, beyond the Cheyenne, we detect a marked amelioration in the vegetation, consequent upon reaching a less arid climate. The Niobrara has considerable large timber along its course; and the grasses grow much more luxuriantly in this neighborhood.

The Black Hills, the only group of mountains in Dakota, lie within, and closely embraced by, the two forks of the Cheyenne river. This group has an elliptic shape, its longer axis lying northwest and southeast. Its highest peaks range between 6,000 and 7,000 feet above sea level. Its core is of granite, around which the sedimentary formations are arranged in concentric ellipses, forming long and beautifully curved "hogbacks," between which are beautiful valleys carpeted with luxuriant grasses and gay with flowers.

Aside from the Black Hills, the surface geology of Dakota is simple. The formations represented are mainly Cretaceous and Tertiary. In the eastern portion, the principal part of the Coteau des Prairies consists of the Azoic formation. This extends southeastward over into Minnesota; its outlines on the east, south, and west, being co-extensive with the coteau. It is surrounded on all sides by Cretaceous beds, which occupy the Red River valley from its head nearly as far as the British line, the valley of the Missouri as high up as Fort Clarke, and the Missouri Coteau nearly to the boundary line. It covers a broad belt west of the Missouri river; and, extending up the Cheyenne, it widens out so as to embrace the earlier formations around the Black Hills. The remainder of the Territory is covered by the Tertiary formation. This consists of the northwest quarter, a considerable area south of the Cheyenne river, and numerous patches on the plains and coteaus, where the erosion of its beds has not been complete. In the northeastern corner, occupying a small part of the Red River valley, the Silurian comes to the surface. As has been stated before, Dakota presents a great variety of climate, both as regards moisture and temperature. The eastern part lies within the humid region, where the rainfall is sufficient for the needs of agriculture; while the plains of the western part are arid, and some parts of them are desert. Between the two is a belt of debatable land, the Coteau du Missouri and the valley of the Missouri, which in some seasons is amply watered, in others, very scantily. Measurements of the actual amount of rainfall have been made for extended periods at only nine points in the Territory. These give the following results:

Stations.	Rainfall in Inches.				
	Spring.	Summer.	Autumn.	Winter.	Year.
Pembina	4.02	7.24	2.71	1.53	15.50
Fort Totten	5.18	7.17	2.50	1.59	16.44
Fort Abercrombie	4.80	8.67	3.46	1.85	18.78
Fort Wadsworth	7.00	10.25	3.96	3.92	24.13
Fort Buford	3.76	4.06	2.01	2.01	11.84
Fort Randall	4.72	6.22	3.40	1.18	15.52
Fort Rice	3.63	4.87	1.54	1.35	11.39
Fort Stevenson	3.41	4.97	2.15	1.31	11.84
Fort Sully	6.52	7.18	1.70	1.14	16.54

It will be noticed that a rainy season is well marked; seventy-three per cent. of the year's precipitation falling in spring and summer, when it is most needed in agriculture. In treating of the agricultural capabilities of this Territory, this fact is generally overlooked; and direct comparison on the basis of the annual rainfall is very misleading.

The mean annual temperature is highest in the southeastern corner, whence it decreases northward and westward. Extremes of temperature increase in the same direction. The following table, compiled from those published by the Smithsonian Institute, illustrates the temperature and its range, in degrees Fahrenheit:

Stations.	Mean Annual Temperature.	Maximum Temperature.	Minimum Temperature.	Range.
Fort Abercrombie	40	104	—40	144
Fort Buford	41	106	—40	146
Fort Pierce	46	.....	.....	.....
Fort Ransom	40	108	—29	132
Fort Randall	47	108	—32	140
Fort Rice	43	.....	.....	.....
Fort Stevenson	42	.....	.....	.....
Fort Sully	46	114	—30	144
Fort Totten	39	.....	.....	.....
Fort Wadsworth	39	102	—85	187
Yankton Indian Agency	48	.....	.....	.....

It should be borne in mind, that in this dry climate, as everywhere in the arid region, the cold is not as penetrating as in the moister regions of the East. On the other hand, many parts of the northwest are subject to what are popularly known as "blizzards." These are very high winds, accompanied by low temperature and fine snow, which, on these level plains, make a combination very trying to man and beast.

The forests of Dakota are confined almost entirely to the Black Hills region. Among these mountains there is an area of some 3,800 square miles covered with valuable timber. The ordinary species are the Douglas pine and spruce. Aside from this section, there is no forest, properly so called. The southeastern corner is prairie, where trees are found only along water-courses and on the faces of bluffs and tops of knolls. On the west border of the Red River valley, there is a little scattered timber, and also on the summit of the Coteau des Prairies. On the Missouri Coteau and the plains west of the Missouri river, timber is extremely scarce. The prairies, plains, and coteaus are covered with grasses; luxuriant on the former, stunted and mixed with

sage and prickly pear on the latter. On the coteaus, the grasses vary in abundance with the undulations of the surface and the variations of soil. Much of the soil is stony or gravelly; and here the product is scanty.

The all-absorbing interest of Eastern Dakota is agriculture; and the Territory is destined, in the near future, to play a leading part in the bread production of the country. By far the principal product is wheat, for the culture of which the soil appears to be wonderfully well adapted. The valleys have a dark, loamy soil, from three to seven feet in thickness. The subjoined table shows that more than seventy-seven per cent. of the cultivated area of the principal counties in 1880 was in wheat. It states the cultivated area, wheat area, and breaking, in acres; the valuation of personal property, and the number of farms in Dakota counties along the Northern Pacific Railroad, for 1880:

Counties.	Cultivated Area.	Area in Wheat.	Breaking.	Number Farms.	Assessed Valuation of Per. Prop'ty.
Cass	142,000	130,000	60,000	2,000	$337,733
Traill	36,000	25,000	12,000	1,060	57,974
Richland	33,000	20,000	30,000	750	.....
Barnes	26,250	18,000	15,000	600	65,644
Stutsman	12,050	6,000	10,000	225	78,000
Kidder	2,690	1,850	3,000	2	25,000
Burleigh	14,000	5,000	10,000	400	.....
Totals	264,990	203,850	142,000	5,037	.....

The wheat raised in the same counties in 1880, was 1,852,200 bushels. This amount is produced by estimating the average per acre at nine bushels, as given by the Census.

The Census Bureau states the cereal product of Dakota in 1859, 1869, and 1879, in its tables for 1860, 1870, and 1880, as below:

Crops.	1860.	1870.	1880.
Wheat	945	170,662	2,880,269
Rye	700	.....	24,359
Oats	2,540	114,837	2,217,132
Indian corn	20,260	133,140	2,000,864
Buckwheat	115	179	2,521
Barley	.....	4,118	277,424
Totals	24,560	422,426	7,352,569

During the months of September, October, November, and December, 1880, the shipments of wheat over the Northern Pacific Railroad were 2,800,000 bushels; of which seventy-six per cent. was of the highest grade, and sold at seventy-five to eighty-five cents per bushel. Nearly all of this went to Duluth, Minnesota. The Red River valley is wonderfully well adapted to the culture of wheat; and there it is cultivated on an immense scale by the aid of the most improved agricultural machinery. It is raised so cheaply as to compete successfully even in the English market, after paying the cost of transportation for nearly 5,000 miles.

The valley of James river is now attracting great attention as the coming wheat field of Dakota. Its soil is said to be fully as deep and rich as that of Red river; while the ease with which land may be acquired there, large areas being yet untouched, is attracting settlers to this section in large numbers.

There is probably no portion of our country which offers to-day as flattering inducements to immigration as the eastern portion of this Territory. The amount of capital required to embark in wheat raising is not large; while, barring grasshoppers, the profits are certain and great. Besides the cost of the land, which differs with the location as regards railroads and contiguous settlements, it is estimated that the total cost of breaking, seeding, harvesting, threshing, and delivering at the railroad, averages $10 per acre, which, after the first year, is reduced to $7.50.

While wheat is at present, and probably will long continue to be, the principal grain product of the Territory, owing to the immense profits to be realized from it, other cereals are equally well adapted to the soil; oats yield twenty-six bushels per acre; barley and rye do equally well; potatoes grow to an astonishing size; corn is somewhat of an experiment as yet, and it may be that the climate is too severe to allow it to ripen.

Probably the largest wheat farm in the Territory is one containing 100,000 acres, situated in the James river valley. It is in two sections, 40,000 acres lying 30 miles south of Jamestown, and 60,000 about the same distance north. Teams, seeders, harvesters, and threshers by the score are needed for the cultivation of these tracts, besides a small army of men. Even the telephone is brought into requisition for the management of such an estate.

The western part of the Territory contains little arable land. Over most of the part west of the Missouri river, irrigation is necessary. The amount of water in most of the streams is limited; while in the case of the Missouri and Cheyenne, which are the only streams that carry much water, the bluffs are so high and the fall of the stream so slight that the water can not be carried to the top of the bluff, and therefore is available only for the narrow belt of bottom land.

The exemption laws of Dakota allow each man $1,500 of personal property, together with his homestead, not to exceed six acres of land in a town, or a farm of 160 acres. The tools and implements of a mechanic, to the value of $200, and the books and instruments of professional men, to the value of $600, are exempt from taxation.

The amount of live stock in the Territory, as returned by the last Census (1880), is as follows: Cattle, 200,000; sheep, 50,000; swine, 75,000. The cattle interest is but commencing its development. There are fine ranges on the plains adjacent to the Black Hills on the south, east, and north; and they are rapidly being occupied by cattle driven up from Colorado and Wyoming. In the eastern part of the Territory little attention has been given to the raising of cattle for beef.

The mineral wealth of Dakota is centred in the Black Hills. For many years it had been a current tradition that there was gold there; but this report did not assume tangible form until 1874, when some miners connected with General Custer's expedition found gold in placers, in paying quantities. The United States army attempted to stop the rush that ensued, upon the ground that the Hills were a part of the Sioux Reservation; and for a time they succeeded in keeping the miners off. This attempt was soon abandoned, and the Hills given over to the miners. The first discoveries of gold were in placers, which were speedily worked out. Then followed, in due course, the discovery of the sources of the placers, which are now yielding largely and steadily. The mines of the Black Hills produce gold only. In form the deposits are true fissure veins. The ore is native gold, in quartz, and is, in most mines, of a very low grade. This is compensated for by the great breadth of the veins and the fact that the ore can be worked in stamp mills, and does not require smelting. With some of the mines the production is simply a question of the number of stamps

that can be run, as the ore can be quarried with any degree of rapidity. From 100 to 400 stamps is not an uncommon plant. Mining the ore is very cheap thus far, as few mines have got to any great depth below the surface, and it is simply a question of quarrying.

The total production of this section in 1879, from the circular of Wells, Fargo & Co., was $3,208,987. In 1880 the production was considerably increased, amounting to $4,123,081. These mines have a degree of certainty and permanence which is wanting in most investments of a like nature, and, under good management, should continue to be remunerative for many years to come.

Coal of good quality and in workable quantities, is found in many localities west of the Missouri river. It is lignitic, from the Cretaceous or Tertiary beds, which cover or underlie most of this part of Dakota.

The population of the Territory, according to the Census of 1880, was 135,180, having increased in ten years 120,999, or 853 per cent. The following statistics regarding the population are from the returns of the Census:

Population.	1880.	1870.	Population.	1880.	1870.
Total	135,180	14,181	Foreign	51,793	4,815
White	133,177	12,887	Male	82,302	8,878
Colored	2,003	94	Female	52,878	5,303
Native	83,387	9,366			

The Territory is divided into ninety-three counties. The majority of these are unorganized, having little or no population. A number of them are included in the Sioux reservation.

Fargo, the metropolis of Northern Dakota, has a population not far from 5,000. It is an enterprising city, doing an immense business, running up into the millions annually. It has the Holly system of water-works, and gas and street railways are about to be introduced.

Various plans for subdividing the Territory have been agitated for some time past; and it would seem very proper that some subdivision were made before the Territory is admitted as a State. It contains three centres of population, differing widely in their interests and the origin and genius of their people, and distant from one another by almost the length or breadth of the

Territory. First, there is the southeast corner, which was earliest settled, and which, up to 1870, contained $\frac{11}{100}$ of the population. The settlers here are mainly Americans, who had emigrated from the neighboring States of Iowa, Illinois, and Missouri. Their sole occupation is farming. Separated from this section by an almost uninhabitable stretch of coteau, and with no railroad communication save the circuitous route via St. Paul, is a centre which may be located in the Red River valley, but which has spread westward along the Northern Pacific Railroad as far as the Missouri river. This people is largely foreign, a considerable proportion being raw immigrants, the balance being the overflow from Minnesota, Wisconsin, and Michigan. Like the former, their occupation is almost entirely farming. The third and most distinct group is that of the Black Hills. A great stretch of inhospitable plains separates this from each of the others—a gap that can never be filled by settlement. The people of this group are Far-Western in their genius and type. The principal occupation is, and will long continue to be, mining. Agriculture will never assume any prominence in this region; and, while it may become a stock raising section, this interest will never bring a large population. Certainly, nature never indicated a plainer division of political organizations.

It is proposed to cut off the second group by a line along the 45th parallel, then to divide the southern portion on the 24th meridian west of Washington. This would leave the Black Hills practically by themselves, as the area of plains included with them can support but a sparse population of cattle-men. All the agricultural lands would be placed in the first and second sections. The populations of the three sections would be, according to the Census of 1880, as follows: First, 81,671; second, 36,909; third, 16,600. Aside from party considerations, the advantages of such a subdivision must be obvious.

Considering that there were less than 15,000 inhabitants in Dakota in 1870, and that a very large proportion of the present population have arrived within the past five years, the following statement from the Tenth Census, showing eighty-three manufacturing establishments engaged in the three principal industries only, with a product of nearly $1,800,000, denotes a remarkable degree of enterprise, full of promise of an early and rapid increase of wealth, destined to be greatly accelerated by the extension of railways into Montana and Wyoming:

Business.	Number Establishments.	Capital.	Hands Employed.	Amount Paid in Wages.	Materials.	Products.
Bricks	14	$ 25,600	89	$ 31,672	$ 16,161	$ 76,685
Flouring and grist mill products.	30	289,500	93	43,874	994,191	1,248,006
Lumber, sawed	39	113,750	328	138,379	175,470	444,542

In 1880, the Territory contained six National banks, representing a total capital of $425,000, with a circulation of $302,290; and eighteen private banks, with a capital of $127,511, holding nearly $400,000 in deposits.

In 1879, there were 17,000 new farms taken up, and recorded in the United States land offices. These were in addition to the large amount of land purchased from the railroad companies. The year 1880 saw a much larger amount of settlement than 1879. During the twelve months ending June 3, 1880, there were 8,819 entries at the United States land offices of Fargo, Bismarck, and Grand Forks, amounting to 1,321,682 acres. Besides this, the Northern Pacific Railroad sold 224,842 acres; making a total in this northern section of 1,546,524 acres.

The Missouri river, which traverses the Territory diagonally, is navigable during medium and high water for steamers of considerable size, and serves as a highway for a very large traffic, not only to the settlements and military posts along its course, but to the settlements of Montana. The Red river, which forms a part of the eastern boundary, is navigable for small steamers to Fargo and beyond. The stream is sluggish, with little current.

The James river, formerly known as the Dakota, is the third in magnitude and importance in the Territory. It is an affluent of the Missouri, from the left; and its valley separates the two coteaus, the Missouri and Prairie, from one another. It has a broad, fertile valley. Its course is about 330 miles in length. With an average fall of three feet per mile, it furnishes abundant water-power.

The next stream in point of importance to the Territory is the Cheyenne river, which, with its two branches, the Belle Fourche and the South Fork, nearly encircles the Black Hills. It is not navigable. The Big Sioux river forms a part of the eastern boundary of the Territory. It rises in the eastern part, and has a course nearly south, to its junction with the

Missouri. It has a rapid fall, especially at Sioux Falls, where the descent is 110 feet in a single mile. Other streams of importance are the Niobrara, White, and Little Missouri, all branches of the Missouri from the right.

The following statement regarding the financial condition of the Territory in 1880 is from the returns of the Tenth Census, and presents the latest and most authentic information:

Real estate (assessed valuation)	$11,162,163
Personal property (assessed valuation)	9,159,365
Total assessed valuation	20,321,528

From incomplete returns received at the Census office, it would appear that this is about fifty per cent. of the true valuation, which is, therefore, about $40,000,000.

The amount of Territorial tax is $60,145.

The Northern Pacific Railroad crosses Dakota from east to west, nearly on a parallel of latitude. It has a length within the Territory of 294.9 miles. The importance of this road in settling the Territory can not be over-estimated. Mainly by its agency the wonderfully rich wheat lands of the Red River valley have been opened up to settlement, while now emigrants are taking up farms all along its route, from the Red river to the Missouri. In the southeastern corner, the Dakota Southern Railroad connects Yankton with the settlements of Iowa.

There are still large numbers of Indians in the Territory, nearly all of whom are located upon reservations. Of these, by far the greater part belong to the various bands of Dakotas or Sioux. The number is given as follows, by the last report on Indian affairs:

Dakotas	23,920	Gros Ventres	473
Arickarees	654		
Mandans	273	Total in Territory	25,320

The number of Indians out of tribal relations, within the Territory, is very small.

There are allotted to these Indians, in various parts of the Territory, no less than 34,841,900 acres, or 54,440 square miles, of land as reservations. This is more than one-third the area of the Territory, and is an average of 1,377 acres to every man, woman, and child, or more than two square miles to each.

The Dakotas have, until very recently, made no progress whatever towards civilization. Within a year or two, however,

several of the bands have made a start in that direction. The Arikarees, Gros Ventres, and Mandans were originally in a state of semi-civilization. They lived in fixed villages, and busied themselves largely with agricultural pursuits. At present, protected from their hereditary enemies, the Dakotas, they are prospering.

CHAPTER XVI.

TERRITORY OF MONTANA.

In considering the future of our Western States and Territories, there is probably no one which presents a more attractive picture than Montana. It has immense areas of cultivable land; its pasture lands are boundless; while its mineral wealth, the development of which is but just beginning, is almost inexhaustible. Its climate is magnificent; its air like wine.

The Territory is bounded on the north by the British Possessions, the parallel of 49° north latitude forming its northern limit. On the east lie the great plains of Dakota, the line following the 27th meridian of longitude west of Washington. On the south the boundary line is the parallel of 45°, its southern neighbor being the Territory of Wyoming; while on the southwest and west, lies Idaho, the boundary being the sinuous crest of the Bitter Root Mountains.

The area of the Territory is not exactly known; but it is approximately 146,080 square miles. Its mean height above the sea is estimated to be 3,900 feet. The greatest elevation, in the peaks of its mountain ranges, is probably about 11,000 feet; while the lowest point in the Territory, which is on the Missouri, at the eastern boundary, is about 2,000 feet.

The areas between the different curves of elevation, at intervals of 1,000 feet, are as follows:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
2,000 to 3,000	40,700	6,000 to 7,000	9,000
3,000 to 4,000	51,600	7,000 to 8,000	4,800
4,000 to 5,000	19,700	8,000 to 9,000	1,100
5,000 to 6,000	17,100	9,000 to 10,000	100

The history of this Territory, though extending back but a few years, is full of incident. The area was a part of the Louisiana purchase, and was originally apportioned to Nebraska and Oregon. The Territory was formed, with its present boundaries, in May, 1864. Prior to 1861, it contained no settlers, and

no white inhabitants excepting the omnipresent trapper and Jesuit missionary.

It was not, however, wholly unknown. In the early part of the present century, those intrepid explorers, Captains Lewis and Clarke, traversed it twice; and their narrative gave to the world a tolerably correct idea of the Missouri and the Columbia rivers. Later, from 1850 to 1860, numerous expeditions, having in view the selection of a route for a Pacific railroad, crossed it from east to west in a number of places; and their work, though necessarily crude, gave us a map of the country which was in the main correct. The first settlers came there in 1861, discovered the rich placers on Little Prickly Pear creek, and founded the town of Helena, the present capital of the Territory. Placer gold has a wonderfully attractive power for mankind; and soon the new diggings were swarming with miners—men of all classes and degrees. Emigrants from Utah and Nevada discovered the placers at Bannack; and, later, in 1863, the enormously rich ones of Alder Gulch, which in a few months produced $25,000,000 in gold dust. Among the multitude attracted to this new El Dorado, were some of the worst characters in the West. Many of them were desperadoes who had escaped the hands of the vigilance committees of California, and who came here to repeat their crimes. This class of men formed a regular organization for the purpose of preying upon the community. Their organization comprised men in all positions, express agents, bank cashiers, hotel keepers, etc.; while the leader of the gang was the sheriff of the principal county, which gave them certain escape from punishment. Matters grew so bad that it was not only unsafe, but was almost certain death, to travel with any money in one's possession. The community was in a state of blockade. No one who was supposed to have any money could get out of the Territory alive. Moreover, it was dangerous to attempt to cope with the gang; for it was very large, well organized, was made up of desperate men, and ramified throughout society, so that no man knew whether his neighbor was or was not a member.

At last, however, the decent citizens took the matter in hand, and organized a Vigilance Committee, enrolling all whom it was believed could be trusted. That done, their action was prompt and decisive. A number of members of the gang, including the leader, were well known; and they were instantly arrested,

had the form of a trial, and were hung to the nearest tree. Nine were hanged at one time in Virginia City; the remainder of the gang were stupefied—stunned, at this turn of affairs, and hastily decamped, leaving the country for the country's good. From that time, law and order have ruled in Montana.

The placers exhausted, a large part of the floating population left the Territory for new fields. The best element, however, remained to develop the other natural resources. Since then the growth of the Territory has been steady but not rapid. The want of railroad connection with the world outside has been the one great drawback. This want is now being rapidly supplied; and we may look forward to a rapid progress.

The mountain region of Montana forms the western part of the Territory. The eastern part comprises a portion of the great plains. North of the Missouri, there is nothing to break their monotonous roll, between the Dakota boundary and the 113th meridian, excepting two or three small groups of hills, such as the Sweet Grass Hills, and the Little Rocky Mountains. For nine degrees of longitude extends this gentle, uniform slope, rising from 2,000 feet above the sea at the Dakota boundary, to 4,000 at the base of the mountains.

South of the Missouri river, the mountains extend much farther east. Between this river and the Yellowstone, they extend in detached masses and short ranges, east of the Judith river, so as to include its valley; and the area of the plains is correspondingly decreased. South of the Yellowstone, the Yellowstone Range, in longitude 110° west of Greenwich, forms the western limit to the plains. Near the mountains, their inclination is greatest, and their surface is more broken. As we go eastward, they become more nearly level, and the local variations of the surface become less. Their relative sterility, too, is a matter depending, other things being equal, upon their proximity to the mountains. Near the latter, they are clothed with an abundant and luxuriant growth of buffalo grass. Receding from their neighborhood, the grasses become sparser, while artemisia and cacti, in a measure, take possession of the soil.

The mountain region comprises the western part of the Territory. It is composed of the same parallel arrangement of ranges and valleys which have heretofore been noticed as being almost universally characteristic of the West. The ranges

trend a few degrees east of south, and west of north. The northwestern part of the Territory is made up of a number of these ranges, in close order, and separated by narrow valleys, beginning on the east with the Missouri Range, and ending on the west with the Bitter Root. South of latitude 46° the Missouri and all the other ranges end abruptly, leaving only the Bitter Root Range, along which the boundary line of the Territory passes, to represent the group. Farther eastward the great branches of the Missouri, the Jefferson, Madison, Gallatin, and Yellowstone, are separated from one another by short ranges; while east of the latter river rises the broad and rugged Yellowstone Range. The principal rivers of Montana are the Yellowstone, Missouri, and Clarke's Fork of the Columbia. The first two of these are navigable at high water through a great part of their length. The Missouri, indeed, is navigable to its head, where the three great branches, the Madison, Jefferson, and Gallatin, unite. There is, however, one break in its navigability, caused by the Great Falls, near Fort Benton. This can be remedied, however, by a short canal. The Yellowstone is navigable by small steamers, at high water, as far as the Gate of the Mountains; and by mackinaws, or flat-boats, 100 miles farther, at all stages of water. The branches of Clarke's Fork of the Columbia, which flow through narrow valleys and mountain gorges, are too rapid to be navigable.

The climate of Montana is one of the most attractive features of the Territory. The effect of its high latitude is more than compensated for by the fact that its elevation is less than that of the country lying to the south: so that its average temperature is higher than in Wyoming, and no lower than in Colorado. The following table, abstracted from the Smithsonian Temperature Tables, shows the average temperature, in degrees of Fahrenheit, in the valley and plains portion of the Territory:

Stations.	Mean Annual Temperature.	Maximum, Single Obser'n.	Minimum, Single Obs'n.
Camp Cook	45	.....	.....
Cantonment Stevens	47	.....	.....
Deer Lodge	41	98	—32
Fort Benton	47	105	—38
Fort Smith	49	.....	.....
Fort Ellis	45	102	—53
Fort Shaw	46	112	—43
Helena	43	.....	.....
Camp Baker	.....	98	—43

Both rainfall and atmospheric humidity are markedly above the average of the arid region. Of the latter, we have no exact figures. The former is well illustrated by the following table from Powell's "Arid Lands" and the Smithsonian Rain Tables:

Stations.	Rainfall in Inches.*				
	Spring.	Summer.	Autumn.	Winter.	Year.
Fort Benton	5.34	4.48	1.65	1.79	13.26
Fort Buford, D. T.	3.76	4.06	2.01	2.01	11.84
Fort Shaw	2.18	2.30	1.34	1.13	6.95
Helena	3.26	4.40	4.91	4.57	22.14
Fort Smith	3.56	1.74	5.24	2.59	13.13

The flora of the Territory is, in its main features, very similar to that of other parts of the West. The plains are covered with grasses; luxuriant in some localities; sparse, and intermixed with artemisia and cacti, in others. In the spring and early summer the moister plains are gay with countless blossoms. The mountains are everywhere covered with dense forests of coniferæ, fringed at the base with quaking aspens. Pine and spruces grow to a large size, and will furnish immense quantities of valuable lumber. The mountain valleys are carpeted with rich grasses, or, at the higher altitudes, covered with forests.

The fauna is varied and abundant: that of the plains is similar everywhere. The buffalo and antelope, and, in the winter, the deer and elk, and several species of wolves, prairie dogs, and rattlesnakes, are the commonest. A large part of the northern band of the buffaloes still ranges over these plains; although they are fast approaching extinction. Among the mountains, large game, such as mountain sheep, elk and deer, are still very abundant in the unsettled localities. The moose is found in the damp, cool forests, especially in swampy tracts of country. On the mountains of the northern part, neighboring on British Columbia, that rare animal, the Rocky Mountain goat, is occasionally found. Bears of all species are numerous. Wolves, wild-cats, wolverines, and occasionally a panther, are to be found.

The resources of Montana, present and prospective, lie in its agriculture, stock raising, and deposits of precious metals and coal. The first is, as everywhere in the West, dependent upon

* The figures of the last two stations depend upon observations taken for one year only. Those of the first three stations are the mean of five years or more.

irrigation; so that the extent and importance of this industry must be measured by the amount of water. It is estimated that eight per cent. of the area of the Territory, or 11,500 square miles, can be placed under irrigation, by using the water carried by the streams in an ordinary season, to its fullest extent. All the land suitable for cultivation in the valleys of the streams flowing to Clarke's Fork can be irrigated. Among them are the beautiful valleys of the Bitter Root and Deer Lodge. In the former the climate is mild; ripening every crop which can be cultivated in a temperate climate. The climate of the latter is, owing to the greater elevation, rather severe, and only the hardier cereals can mature.

The larger part of the valleys of the Jefferson, Madison, and Gallatin, can also be placed under irrigation. The latter is one of the finest valleys in the West. At its foot the Jefferson, Madison, and Gallatin unite to form the Missouri. Thence it extends southeast and south twenty-five to thirty miles, with a breadth at the south of fully thirty miles. Its elevation ranges from 4,000 to 5,000 feet. Its climate is mild, and adapted to nearly all cereals and vegetables. It contains now several small towns; and a considerable portion is under cultivation.

The Missouri flows for seventy-five miles through a broad valley, much of which can be irrigated from it and its numerous small branches, and be rendered highly productive. Entering the plains, the question of utilizing all its water becomes simply one of choosing the land to which the water can be most cheaply and profitably applied. The case is the same with the Téton and Sun rivers, and the numerous smaller streams which head in the Missouri Range and flow directly out upon the plains. From the south, the Missouri receives numerous tributaries, each of which will water its quota of land. The principal among them are Smith's, Judith, and the Muscleshell rivers. Judith river flows through a fine valley, which promises to be one of the best agricultural valleys in the West. The Muscleshell is a long stream, and flows for the most of its course through a comparatively barren country. In the dry season, it has water only in its upper part.

Above the Gate of the Mountains, the Yellowstone flows through a long valley, seventy-five miles in length, and two or three in average breadth. Below, it enters the plains; and the case there is similar to that of the Missouri. The immediate

bottom lands of this stream are described as very fine; and they are sufficiently extensive to utilize the larger part of the water of this river. In 1877, it was estimated that there were under cultivation, in the Territory, 265,000 acres.

The table below shows the cereal products of Montana in 1869 and 1879, as given by the Census Bureau:

Crops.	1870.	1880.
Wheat	181,184	469,898
Rye	1,141	430
Oats	149,367	900,915
Indian corn	890	5,649
Buckwheat	988	437
Barley	85,756	39,970
Totals	418,756	1,417,089

The grazing interest of Montana is already of considerable importance; while the possibilities for its future increase are very great, judging from the vast areas of unoccupied grazing land. The great extent of the plains is practically untouched by the herdsman; while many mountain valleys, especially in the northwestern corner of the Territory, are, thus far, untrodden by the hoofs of cattle. There is scarcely any part of the Territory excepting upon the mountain ranges, where the climate is not sufficiently mild and the snow-fall sufficiently light for cattle to winter out of doors with almost absolute safety. Occasionally, however, there comes a severe storm or a period of very cold weather which destroys a large number of cattle. To guard against such occurrences, most ranchmen keep on hand a supply of hay, and many provide shelter for their stock. Such a period occurred in the winter of 1871–72, when, on two occasions, the temperature fell to —52°, and it was estimated that one-tenth of the cattle in the Territory were destroyed. Such weather, it is perhaps needless to add, is very exceptional.

Out of the total area of the Territory, it is estimated that fully 100,000 square miles, or more than two-thirds, are valuable as grazing lands. Of course the grazing differs greatly in quality in different sections; and it should be added, that, in all probability, most of the best quality of grazing lands is already occupied.

In 1877, it was estimated that there were in Montana 220,000 head of cattle, 40,000 of horses, and 120,000 sheep. The number has since then largely increased, as the movement of the grazing interest has been in that direction. In 1880, the Census returns showed, that, in round numbers, there were 489,500 cattle, 512,600 sheep, and 29,000 swine held in the Territory—a tremendous increase over 1877; although it should be said that the figures for 1877 are, in all probability, much too small.

The surface geology is by no means well known, even in its general features. The early government expeditions made no study of this subject. For almost all that is known to-day we are indebted to that indefatigable explorer, Dr. F. V. Hayden; and his work was confined almost entirely to the eastern and southern parts. In general terms, we may say, that the eastern two-thirds of the region of the plains are covered with Tertiary formations. Of this formation are the "mauvaises terres" of the Lower Yellowstone. Here, the surface rock is a soft clay-stone, which disintegrates rapidly upon exposure, covering the lower ground to a depth of several feet, it may be, with a soft, powdery soil, which supports little or no vegetation, and into which, in dry weather, animals sink as in soft snow; while, when wet, it becomes mud of incalculable depth, and inexpressible stickiness. This formation is, in most localities (for it is found far and wide over the West), a perfect mausoleum of strange forms of extinct animals. In some places, the soft clay is literally filled with their bones.

West of the Tertiary, the Cretaceous formation rises to the surface, and extends nearly to the base of the mountains. It is broken in several localities by little ranges and groups of hills, which bring to the surface the earlier formations, usually surrounding a core of granite. The mountain region is mainly granitic; but in the valleys and along the base of the ranges, are outcrops of the older stratified rocks, the Silurian preponderating.

The placer mines of Montana, so far as discovered, have long been exhausted; while vein mining, although it has been going on for several years, is yet in its infancy. It is estimated that $100,000,000 have been taken from the former class of deposits, one-fourth of which was from Alder Gulch.

Vein deposits of gold and silver have been discovered in the mountains of almost every part of the Territory. Few of these

discoveries have been fully developed as yet, owing mainly to the want of capital.

The product for the year 1879 was $3,629,000. Of this about two-thirds was gold, and one-third silver. That of 1880 showed a slight increase, being a total of $3,822,379, of which two-thirds was silver and one-third gold.

It is probable, that, with the impetus recently given to the whole mining of the country, the rich mineral resources of this Territory will soon be developed to such an extent as to place it among the principal producers of the precious metals.

The only railroads at present within Montana are the Utah & Northern and the Northern Pacific, which have been constructed for a few miles over the southern and eastern boundaries. It is probable that the former road will soon be built as far as Helena, the capital of the Territory, thus connecting it with the Union and Central Pacific Railroads at Ogden, Utah. The Northern Pacific will eventually cross the Territory from east to west, coming up the Yellowstone river, and passing down some branch of Clarke's Fork of the Columbia. It is being pushed forward with vigor.

The manufacturing industries are at present of small but growing importance. They are, in the main, confined to smelting works, flour and lumber mills.

The number of establishments, capital, and hands employed, products, and other particulars in relation to these industries, are given below, from the Tenth Census:

Business.	Number Establishments.	Capital.	Hands Employed.	Amount Paid in Wages.	Materials.	Products.
Flouring & grist mill products	15	$159,500	52	$ 28,056	$365,542	$485,137
Lumber, sawed	36	208,200	350	181,656	167,205	556,320
Ores smelted	....	....	....	....	....	....

The population of the Territory by the last Census (1880) was 39,157, an increase over the previous Census of nearly 100 per cent. The population by counties is as follows:

Beaver Head	2,712	Jefferson	2,464
Choteau	3,058	Lewis and Clarke	6,581
Custer	2,510	Madison	3,016
Dawson	180	Meagher	3,744
Deer Lodge	8,876	Missoula	3,582
Gallatin	3,643		

The total population is classified as follows:

Male	28,180	Foreign born	11,515
Female	10,977	White	35,468
Native born	27,643	Colored (including Indians)	3,689

Helena, the capital, is situated at the east base of the Missouri Range, a few miles west of the Missouri river. Other towns are Butte, a mining camp at the head of Deer Lodge river; Deer Lodge City; Bannack; Virginia City, on the once celebrated Alder Gulch; and Bozeman, in the Gallatin valley.

In 1880, there were in operation in Montana three National banks, with a capital stock of $350,000, having an outstanding circulation of $286,497; and thirteen private banks, with a capital of $446,708.

The Territory contains a large Indian population. The tribes represented there, are the Blackfeet, Blood, Piegan, Crow, Flathead, Pend' Oreille, Kootenai, Gros Ventre, Assinniboin, and Dakota, numbering, in the total, nearly 20,000. All these Indians are theoretically upon reservations; and probably most of them are practically there. These reservations cover a large proportion of the area of the Territory, amounting, altogether, to no less than 34,156,000 acres, or 53,370 square miles—more than one-third of the Territory. Nearly all of this great area is, however, in the plains region, where the land can never be of much value.

The Census of 1880 furnishes the following data regarding the wealth, debt, and taxation:

Total valuation	$18,609,809
County debt, bonded	339,196
County debt, floating	401,709
Territorial tax, for general purposes	55,829
County tax for general purposes	244,785
County tax for school purposes	73,300
School district taxes	9,388
School district debt	32,753

The assessed valuation is probably about seventy per cent. of the true valuation.

CHAPTER XVII.

TERRITORY OF WYOMING.

It is now more than ten years since the southern portion of Wyoming Territory was opened to settlement by the Union Pacific Railroad; but, beyond the small towns along the line of the road, which were built mainly to supply its necessities, settlement has made little progress. The reason of this is not difficult to discover: the railroad traverses its most worthless portion. The country is high, and the climate severe; for this reason, agriculture is difficult and precarious, and cattle are not safe in winter without shelter and provision. The western half of the road from Fort Steele, at the crossing of the North Platte, to the western boundary, is, for most economic purposes, a desert. Water is extremely scarce and bad. There is practically no grass, the only vegetation being greasewood and sage. The northern half of the Territory, which is fertile and well watered, and possesses a much milder climate, besides being almost inaccessible, has, from time immemorial, been occupied by the Sioux Indians, who have held it against the encroachments of the whites with the most jealous care. These dogs-in-the-manger have been recently expelled from this region; and it is rapidly filling up with ranch and stock men.

The Territory was mainly a part of the Louisiana purchase. It was formed from portions taken from adjoining Territories, and organized in July, 1868. The first settlements were the trading posts of Forts Laramie and Bridger. Until the Union Pacific Railroad opened its doors, settlements were very few and far between; and its progress since that time has been by no means rapid, owing to causes detailed above.

Wyoming is bounded by the meridians of 27° and 34° and the parallels of latitude of 41° and 45°. It is in shape very nearly a rectangle. On the north lies Montana, on the east Dakota, on the south Colorado and Utah, and on the west Utah and

Idaho. Its area is 97,890 square miles; its mean elevation above the sea, 6,400 feet. The lowest point in the Territory is 3,500 feet above the sea; while its highest peaks tower to an altitude of nearly 14,000 feet. The character of the country as respects elevation is shown by the following table:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
3,000 to 4,000	3,000	8,000 to 9,000	7,200
4,000 to 5,000	19,000	9,000 to 10,000	4,300
5,000 to 6,000	20,000	10,000 to 11,000	2,300
6,000 to 7,000	24,000	11,000 to 12,000	900
7,000 to 8,000	17,000	12,000 to 13,000	190

The greater part of its area lies between 4,000 and 8,000 feet. The highest country lies in the southern and western part; while towards the north and east there is a general slope downwards.

The eastern part of the Territory makes up a portion of the Great Plains. The continuity is broken in the northeastern corner by the Black Hills of Dakota, which lie about one-half in Wyoming and one-half in Dakota. They are an elliptical mass of mountains, the axis trending about N. N. W. and S. S. E. They rise about 6,000 feet above the sea, and half that height above the surrounding plains. North, south, east, and west from them, extend the rolling, billowy plains, for hundreds of miles.

The high ranges of Colorado extend northward into Wyoming, occupying a part of the area included within the bend of the North Platte, sinking into the plain before reaching that river. They are all of much less altitude than in Colorado. The Laramie Range, which represents all that is left of the great Front Range of Colorado, has an elevation of about 9,000 feet. It is crossed by the Union Pacific Railroad at Sherman, at a height of 8,269 feet. The Medicine Bow Range, which is an offshoot from the Front Range, has about the same elevation as the Laramie Range. Between them lie the beautiful Plains of Laramie. The Park Range is the third and last of the series. Beyond these, the country consists of a series of high, cold, desert plateaux. The first swell in this plateau, beyond the North Platte, separates the waters of the Atlantic from those of the Pacific, the Platte river from the Green. Thence the country descends to the Green river basin, the arid valley, upon which that fugitive name "Great American Desert" has finally been bestowed, and where it will probably remain. A second rise of the plateau separates the waters of the Pacific from those of the Great Basin, the Green

river from the Bear. These divides are broad and flat, the water partings are ill defined, and they contain numerous salt lakes without outlets, and streams which flow nowhere.

The great system of ranges known as the Rocky Mountains is composed of two sections, separated by this great extent of plateaux, stretching northwest and southeast for 200 miles. The trans-continental traveler on the Union Pacific Railroad, crosses this great depression between the ranges, and sees little or nothing of the Rocky Mountains.

Toward the northern part of Wyoming, the mountain system suddenly starts again into being, with a great breadth of alternate mountain and valley. On the east, the Big Horn Range rises from the plains to a height of 12,000 feet above the sea level. Then follow the Big Horn basin and the valley of Wind river, upon which frown the lofty, snow-capped peaks of the Wind River Range, with their glaciers and eternal snows, and the rugged, volcanic peaks of the Yellowstone Range. West of the former lies the upper part of the Green river basin, at whose head are the Gros Ventre and other mountains and hills about the head of the Snake river. Here the country is all on edge. There is but little valley country. Excepting Jackson's Hole, a valley at the base of the Tétons, the valleys are mere gorges and canons.

Beyond the Yellowstone Range, which marks roughly the eastern boundary of the Yellowstone Park, the country is mainly a high plateau, about 8,000 feet above the sea, densely timbered and abundantly watered. The Yellowstone National Park, embracing a large tract of this plateau, is one of the most remarkable sections of the globe, full of natural wonders. It is briefly described further on in this chapter.

Wyoming has several climates, which differ materially from one another. The high country in the northwest has, in common with the high mountains everywhere, a moist climate, with a very large rain and snow fall. The summer begins with July, and ends with August. Frost may occur on any night during the year; and the mean annual temperature is low.

On the plateaux of the south and southwest, the climate is arid, the precipitation is light, and the mean annual temperature low, while the constant wind conspires to render the atmosphere anything but pleasant to the unfortunate who is condemned to spend his days there. The climate of the eastern part is very

much like that of the plains of Colorado. Northward it is, perhaps, more temperate; but there is the same dry atmosphere, light rainfall, great difference in temperature between summer and winter, and day and night, while the mean temperature is about the same.

The fauna and flora of Wyoming are almost precisely the same as those of Colorado. Buffalo are still found in small bands upon the plains and in the valleys of the Big Horn and Wind rivers; while moose are seen, though rarely, in the high, moist region in the northwest.

The plains and the less arid valleys, as well as the lower slopes of the mountains, are covered with bunch grass; while the plateaux of the southwest are scantily clothed with sage and greasewood. The mountains are everywhere covered with forests of coniferæ. The trees are large, and will ultimately be useful for lumber. Thus far, they have scarcely been touched by the woodman's ax. The only purposes for which they have been used are for railroad ties, and, to a limited extent, for smelting, at the mines on the eastern base of the Wind River Range.

Of the agricultural resources of the Territory, there is little to be said, for the reason that so far there has been but little effort to develop them. The amount of land under cultivation is very small. The arable, i. e., irrigable, land is nearly all confined to the eastern half, the western half lying too high or having too small a supply of water, to make it valuable as an agricultural country. A rough estimate, based upon the amount of water available for irrigation and the fact that there is an abundance of land for using it all, gives a proportional area of one-tenth of the Territory as irrigable land. This is an extreme estimate, and presupposes the use of reservoirs for storing the water, and the utmost economy in its use. The regions to be irrigated are as follows: A part of the plains east of the Laramie Range, the Laramie Plains, the valley of the North Platte, the valleys of Tongue and Powder rivers, the basin of the Big Horn, the Wind river valley, the Green river basin, and last, but by no means least, for it is one of the finest valleys of the West, the classic valley of the Sweetwater.

Thus far, according to the Census reports, only 1,000 to 2,000 acres have been improved. The cereal products in 1869 and in 1879, as given by the Census tables of 1870 and 1880, were:

Crops.	1870.	1880.
Wheat		4,674
Rye		78
Oats	100	22,513
Indian corn		
Buckwheat		
Barley		
Totals	100	27,264

The grazing interest is large and rapidly increasing. The great extent of land suitable for carrying on this industry will make it always a very important one, perhaps the most important one in the Territory. The plains east of the Rocky Mountains, the Laramie Plains, with the country west of them as far as the North Platte, the Sweetwater and Wind river valleys, and the Big Horn basin, are all covered with rich grasses. The borders of the Green river basin, and most of the narrow mountain valleys, can also be utilized as grazing grounds.

The southern part of the Territory near the railroad is quite well stocked with cattle already; while the cattle men are following fast upon the heels of the departing Sioux into the northern part of the Territory. In 1877, the total number of cattle held in the Territory was estimated at 300,000; of sheep, 200,000; and of horses, 20,000. These figures are now largely increased, as cattle have been moving into the Territory rapidly during the past three years. In 1880 the Census returns showed 575,000 cattle, 350,000 sheep, and 4,000 swine.

The surface geology of Wyoming is detailed and complicated. Excepting in the neighborhood of the mountains, where there is a narrow strip of Cretaceous, the plains are Tertiary. The Black Hills are an island of granite; while Cretaceous, Jurassic, Carboniferous, and Silurian strata are uptilted, in succession, in ellipses about the granite core. The Laramie, Medicine Bow, and Park Ranges have summits of granite, flanked by the upturned edges of sedimentary beds of nearly all ages. The Sweetwater Mountains, south of the Sweetwater river, are of granite. The plateaux south and southwest of them and the Green river basin, are composed of the soft and friable beds of the Tertiary and Cretaceous formations.

In the northwestern part of the Territory, we find the central part of the ranges composed of granite, while the flanks and

foot-hills are of the earlier, stratified beds. Exception to this should be made in the case of the Yellowstone Range, and most of the other mountains of the Yellowstone Park, which are volcanic throughout; while the high level country of the Park is almost entirely floored with trachyte or basalt.

The mining interests of the Territory have not yet assumed much importance, excepting in the matter of coal. Gold has been mined for several years at the southeastern base of the Wind River Range, but without much success, as is attested by the present abandoned condition of the workings and the depopulated towns.

Silver mines have been discovered and are now being worked in the Park and Medicine Bow Ranges, near the south line of the Territory. Mines have also been worked in the Sweetwater and Seminole Mountains and about the base of Laramie Peak.

The principal deposits of coal are found in the southwestern part, near Evanston, Rock Spring, and Carbon stations, on the Union Pacific Railroad, and on a branch of Bear river, a few miles north of the road. The deposits are lignitic, contain fifty to fifty-four per cent. of carbon, and are of the Tertiary or Cretaceous age. These deposits are extensively worked, and furnish nearly all the coal used by the Union Pacific Railroad and by the settlements for hundreds of miles east and west.

The total production in 1877, which is about the same as the years immediately preceding and following, is estimated at 175,000 tons.

The only railroad, practically, within the Territory, is the Union Pacific, which crosses it near its southern boundary, in a general east and west direction. Four hundred and fifty-four miles, or nearly one-half of its total length, are within this Territory. Besides this, small portions of the Colorado Central and Denver Pacific, which connect Cheyenne with Denver, Colo., are within its limits. A railroad is projected to connect Cheyenne with the Black Hills. This will open up a fine grazing region. Also, a line is projected as a branch of the Union Pacific, to start from Granger station, at the junction of Black's and Ham's Forks, and, by a generally northwest course, up Ham's Fork, down the Bear and Snake rivers, connect with the settlements in Western Oregon.

The population of Wyoming in 1880 was 20,788. Of these, 14,151 were males, 6,637 females; 14,943 were natives, and

5,845 foreign; 19,436 were white, and 1,852 colored, including 974 Chinese and 139 Indians and half-breeds not in tribal relations. The total population by counties was as follows:

Albany	4,625	Pease	687
Carbon	3,413	Sweetwater	2,561
Crook	239	Uinta	2,879
Laramie	6,409		

The report of the Territorial Auditor for the year 1878, regarding the finances of the Territory gives the assessed valuation at $10,066,220, which was reduced by a board of equalization to $9,602,720, and the Territorial tax at $28,808. From incomplete returns received at the Census office, it is indicated that the above assessed valuation is about sixty-six per cent. of the true valuation, which therefore, is approximately $15,000,000.

In 1880, there were in the Territory two National banks—with a capital of $150,000, and a circulation of $57,600—and four private bankers.

Until within the last three or four years, the whole northern half of Wyoming has been occupied by Indians. Nearly all of this great area has been held by Sioux, who have been very jealous of the encroachment of whites. Their recent expulsion leaves but a comparatively small part of the Territory occupied by Indians. The only reservation is that of the Shoshones and Arapahoes, in the valley of Wind river. It has an area of one and a half millions of acres; and upon it are congregated 1,250 Shoshones and 900 Arapahoes. The Shoshones have, from time immemorial, been at peace with the whites, and, in the various wars with the Sioux, have furnished to the army, corps of scouts, who have done valuable service. The Arapahoes have but recently been moved to this reservation from their old range in Southern Dakota and Nebraska. Besides these Indians, Bannacks sometimes wander into the Territory from Idaho, and Utes from Colorado; while small scattering bands of Sioux sometimes appear in the country about the Big Horn Mountains.

THE YELLOWSTONE NATIONAL PARK

occupies an area nearly as large as the State of Connecticut, in the northwestern corner of Wyoming. It is by far the most marvelous collection of geysers, hot springs, and other volcanic phenomena, upon the globe. This region was, by act of

Congress, passed in the winter of 1871 and 1872, reserved from settlement, and constituted a National Park. The area so reserved is between 3,500 and 3,600 square miles: nearly all of it is in Wyoming, a narrow strip extending westward over into Idaho and Montana, and northward into the latter Territory.

Its surface is mainly a high rolling plateau, broken by several isolated groups of mountains, while along its eastern border rises the high and rugged Yellowstone Range. The mean elevation of the Park above the sea is about 8,000 feet; while the highest mountains rise to elevations between 11,000 and 12,000 feet. Almost its whole extent, both of plains and mountains, is covered with dense forests, so dense that for days one may travel without seeing a landmark, and is guided only by the sun or the compass. In these high plateaux and mountains, the Snake, Yellowstone, Gallatin, and Madison have their utmost sources, whence they flow off to the arid plains below. In these forests and mountain recesses still remain in abundance the large game of the country—moose, elk, deer, mountain sheep, bears, panthers, and wild-cats. It is the hunter's paradise.

Within very recent geologic times, this region has been the scene of remarkable volcanic activity. It is almost entirely overlaid by volcanic rock, outflows of lava from some copious rents now concealed. The Yellowstone Range is one of the chips from old Vulcan's workshop, but pared, trimmed, and carved by frost and water. The wonderful phenomena now presented there, are but the last expiring efforts of the god of fire.

The country is honey-combed with hot springs—they are omnipresent: on the plains, in the deepest recesses of the forests, on the mountains, even on their loftiest summits, on the walls and in the beds of the canons, and even in the beds of the lakes and streams, they are boiling and bubbling. There are springs of water and of mud; there are calcareous, siliceous, sulphurous, and iron springs, in infinite variety. They agree in only one particular; they are all hot. Their name is legion.

While there is scarcely a square mile of the Park that does not contain more or less springs, there are certain localities where they are grouped in large numbers, and show greater activity than elsewhere. It is in these places that geysers are found. The principal of these localities are: the White Mountain, or Mammoth, Hot Springs, the Gibbon, Lower and

Upper Geyser basins, the Shoshone basin, the Heart Lake group, and the Mud geysers.

The first named of these is near the northern boundary of the park, on Gardiner's river. The springs (there are here no geysers) are calcareous; and the waters deposit freely, having built a hill a hundred feet or more in height, of a dazzling whiteness, except where striped by bands of yellow, red, and green, from the sulphur and iron deposited. The springs issue from the top of this mound, the water flowing down its sides, through a succession of basins, all beautifully bordered and scalloped.

The Gibbon basin, near the head of one of the branches of the Madison river, is rather a congeries of groups of springs, scattered over a large area. This basin contains a number of geysers of considerable power, throwing water to nearly or quite a hundred feet. The water contains very little matter of any kind in solution; and consequently the deposits are very slight.

The Upper and Lower Geyser basins are situated on the Firehole, a head branch of the Madison river. They are about ten miles apart; but there are springs all along the valley connecting them. Imagine a valley with the shape of an hour-glass, the northern bulb, corresponding to the Lower basin, being much the larger. These bulbs are floored throughout with a white, siliceous deposit, of unknown thickness, the deposit from the geysers and springs. Down the valley winds a small river, whose water is lukewarm from their contributions. All over the valley rise clouds of steam from the springs, which, on frosty mornings, forms a dense fog, filling the valleys. It is in these basins that the greatest activity in the region is manifested. They contain thousands of hot springs, from the size of a horse's hoof to hot lakes covering several acres. The geysers are numbered by the score. They throw columns of water to various heights, ranging from a few feet only, up to 250 feet. Some of the minor ones are perpetual spouters; but most of them, and all the powerful ones, play only at intervals ranging from an hour to several days. One of the most powerful, and perhaps the most interesting, is that known as "Old Faithful," whose interval between eruptions is almost exactly fifty-eight minutes, and which throws water to a height of 150 feet. Another most beautiful one, known as the "Beehive,"

from the shape of its cone, plays at irregular intervals, and throws water sometimes to a height exceeding 200 feet. Another, the "Castle," has built about itself an immense mass of deposit, from which ordinarily it throws an irregular mass of water twenty to thirty feet; but on special occasions, it sends an enormous column up, fully 250 feet skywards. Of the many geysers of this valley, each possesses an individuality; but space forbids any further mention of them.

Further south, on the shore of Shoshone Lake, one of the many beautiful sheets of water which diversify the surface of the Park, is another group of springs and geysers, possessing many unique features. The Heart Lake group lies in a narrow belt along a gulch leading down to Heart Lake. There are but two or three geysers in this group, which is remarkable chiefly for the beauty of the deposits.

Near the west shore of Yellowstone Lake is a boiling spring, which originally burst forth in the bed of the lake, but has now built up a mass of deposit above the surface of the water.

On Yellowstone river, a few miles below the outlet of the lake, is a group of geysers and springs, in which the liquid is not water, but boiling mud, of about the consistency of paint. There is but one geyser in the group: this plays at intervals of about four hours, throwing its nasty compound to a height of forty or fifty feet. A few miles farther down the river, at a locality known as the Sulphur Hills, is a group of large boiling sulphur springs.

The hot springs and geysers are not the only wonders and attractions of this remarkable region. To the lover of natural scenery, it is almost without a peer in its mountains, lakes, waterfalls, and cañons. Yellowstone Lake, at an elevation of nearly 8,000 feet above the sea, is the largest body of water at that elevation on the continent. It has a very irregular shape, with long arms, reaching far inland, and enclosing mountains in its grasp. Shoshone, Lewis, and Heart Lakes are beautiful sheets of water, lying hemmed in by the hills, their deep blue color contrasting finely with the black green of the forests which surround them.

At the distance of a day's drive down the Yellowstone from the lake, the river, heretofore calm and peaceful, becomes fretted by rapids, and then suddenly plunges over a cliff 112 feet in height. A half-mile of quiet meandering follows, when

the great stream suddenly, and without warning, rolls over a second cliff 300 feet in height, into a deep gorge 1,000 feet from top to bottom, down which it rushes and roars in a madly tumultuous course. These are the Great Falls and the Grand Cañon of the Yellowstone. The latter is carved out of a volcanic plateau; its walls are the most rugged of cliffs, unscalable except in one or two places. Their colors are among the most vivid known to art—white, yellow, red, and brown, a barbaric association. This cañon extends some twelve or fifteen miles down the river, and is closely followed by others, so that, throughout the balance of its course in the Park, there are few points at which this stream reaches the sunlight.

Besides these, there is a fine fall of more than a hundred feet upon Tower creek, a large branch of the Yellowstone, and other smaller ones in various parts of the Park.

To the mineralogist, this region presents unusual attractions in the variety of volcanic products everywhere found. Silicified wood—in all degrees of petrifaction, from that having, to the eye, all the semblance of the original, to that changed entirely into quartz crystals, amethyst, or opal, is abundant. Great trunks of trees, several feet in diameter, and a score or more in length, project in bas-relief from the cliffs on the East Fork of the Yellowstone. Obsidian, red, black, and variegated, is plentiful on the volcanic plateaux; and, in one locality, a large dyke of it has been found.

The Park is not at present easily accessible. It can be traversed only on horseback and with a pack train; and consequently comparatively few have yet seen its wonders. But, with the extension of railroads towards it and the construction of wagon roads and hotels within it, there is every prospect that it will soon become as well known as the Yosemite, and that ladies, dressed in the latest civilized fashions, will soon be watching for an eruption of Old Faithful, or climbing down the cañon of the Yellowstone on rope ladders—which the gods forbid.

CHAPTER XVIII.

TERRITORY OF IDAHO.

ONE of the Northwestern Territories, Idaho is bordered on the south by Utah and Nevada, on the west by Oregon and Washington, on the north by British Columbia, and on the northeast and east by Montana and Wyoming. Its limits are: south, the parallel of 42°; west, the Boisé meridian, the course of Snake river, and the meridian which passes through the mouth of the Clearwater; north, the parallel of 49°; east, the meridian of 39° west of Washington, the winding crest of the Bitter Root Range, which generally trends in a southeast direction, and the meridian of 34°. This gives a shape roughly approximating to a right-angled triangle, running nearly to a point at the north, where its width is but a degree of longitude, and with its hypothenuse on the northeast.

This Territory was a part of the Louisiana purchase. Up to 1863, when it was organized, it formed a part of Oregon Territory. When first formed, it was much larger than at present, a part of it having been given subsequently to Montana. Previous to 1850, few whites, and those few consisting of trappers, prospectors, and missionaries, had come within its boundaries. In 1852, gold placers were discovered in the northern part; but they attracted little attention. The discovery of rich diggings on the Boisé river, and of mineral veins in Owyhee county, made somewhat later, induced considerable immigration, yet not what could be called a stampede. Since its first settlement, the growth of the Territory has been steady, but slow, owing to its inaccessibility, and the want of railroad communication with the outside world.

The area of Idaho is approximately 84,800 square miles. Its mean elevation above the sea is 4,700 feet. Its area, classified as to elevation, is as follows:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
1,000 to 2,000	1,000	6,000 to 7,000	9,100
2,000 to 3,000	12,900	7,000 to 8,000	4,000
3,000 to 4,000	15,600	8,000 to 9,000	1,500
4,000 to 5,000	21,600	9,000 to 10,000	400
5,000 to 6,000	18,600	10,000 to 11,000	100

The Territory lies almost entirely within the area of Pacific drainage, a small portion only, in the southeastern corner, draining to the Great Salt Lake. The northern part of Idaho is very mountainous, the valleys are narrow, and both mountains and valleys are covered with dense forests of coniferæ. Farther southward, upon the waters of the Clearwater and Salmon rivers, the valleys become broader, and the forests are confined to the mountains. The principal ranges are the Bitter Root, whose crest forms the boundary with Montana, and whose spurs and offshoots constitute the mountain region of the northern part of the Territory; and the Salmon River Mountains, which consist of a succession of parallel ranges, trending nearly north and south, which separate the primary branches of the Salmon river. These mountains rise to heights of 8,000 to 10,000 feet; while a few peaks stretch skyward above the latter limit.

South of these mountains, stretching nearly across the Territory, is the Snake River Plain. This is a bed of basalt, which in comparatively recent time has overflowed the country from some source at present unknown. Its surface is, in general, level or gently undulating, but is seamed here and there with great crevasses, like a field of old ice. There is little water on the surface. The streams from the mountains soon find an opening, and disappear, to flow underneath the rocky floor, re-appearing, perhaps, at intervals farther down their courses. In the midst of this rocky desert, rising abruptly from the plain 2,500 or 3,000 feet above it, are three lone mountains, known from time out of mind as the Three Buttes. They are visible from all parts of the plain, and have always served as landmarks to the traveler upon this waste, as the lighthouse to the mariner.

The prevailing soil of the Snake River Plain is a loose, drifting sand, which, under the action of the prevailing westerly winds, has been drifted into dunes, on its eastern border. The vegetation consists of a mammoth growth of artemisia, among which is a sparse growth of bunch grass.

East of this plain, towards the Wyoming boundary, the country rises into hills and mountains; while south of it the succession of narrow valleys and sharp, abrupt ranges, so

characteristic of Western Utah and Nevada, makes up the face of the country. The mountains are almost entirely without timber, the valleys covered with artemisia and grasses.

The principal stream is the Snake, or Lewis Fork of the Columbia. This river heads in Wyoming, in the Yellowstone Park. Entering Idaho as a great rushing torrent, it pursues a tumultuous course, earning its old name of "Mad" river. Its course is near the margin of the Snake River Plains; at first south, then west to the western border of the Territory, thence northward. In its westerly course, it makes three falls of very considerable height—the American, the Shoshone, and the Salmon, or Fishing, Fall. It has several large branches, such as the Salmon, Clearwater, Owyhee, Raft, and Portneuf rivers, and Henry's Fork. Altogether, Idaho is a well-watered Territory.

In regard to temperature and rainfall, there is great difference between the northern and southern parts of the Territory. The valleys of the extreme northern part enjoy sufficient rainfall for the cultivation of the soil without irrigation; while, down on the Snake River Plains and the country to the southward, the precipitation is reduced to a minimum. The temperatures of the two parts of the Territory differ in quite as marked a degree; while the moister climate of the northern part lessens the difference between the temperature of day and night, and between summer and winter. Few meteorological observations have been taken within this Territory; but the general facts, as above stated, are apparent to the most superficial observer of the aspect of the country. The only observations on record are at Forts Hall, Boisé, and Lapwai, in the middle and southern parts. The net results are as follows, in degrees Fahrenheit:

Stations.	Mean Annual Temperature.	Maximum Temperature.	Minimum Temperature.
Fort Boisé	52	121	—10
Fort Hall	.....	102	—12
Fort Lapwai	58	110	—15

The fauna and flora are very similar to those of Montana: indeed, the species are practically the same throughout. The mountain region of the north having a greater rainfall and a moister climate than the corresponding portion of Montana, the forests are denser, and the lumber larger and more valuable. The flora of the desert region, too, though not more varied than

in the neighboring Territories, is more luxuriant. Upon the Snake River Plains sage brush grows to an enormous size. I have seen logs of sage, six inches thick, cut and corded up for firewood. Indeed, at the stage and railroad stations on these plains, sage brush furnishes the only available fuel; and it is not by any means a bad make-shift.

Large game is, of course, very scarce in the southern part of the Territory. The northern part, which is as yet almost uninhabited, is teeming with all the kinds of large game found upon the mountains or in the forests of the Northwest.

The arable land of Idaho is estimated at seven per cent. of its area, or about 6,000 square miles. Some of the small valleys in the northern part can safely be cultivated without irrigation. Throughout the balance of the Territory, irrigation is necessary. There are fine valleys on all the streams flowing into the Snake from the east—the Clearwater, Salmon, Weiser, Payette, and Boisé—with an abundance of water. In the south, there are a number of fine valleys; but the water supply is limited, and only a portion of them can be irrigated. The Snake river itself can be of little value for irrigation; as, through most of its course, it is confined within rocky walls of basalt of considerable height, so that, although the fall is great, the water can not be brought to the surface.

The total cereal products of this Territory, according to the statistics of the Census Bureau, rose from 255,591 bushels in 1869, to 1,298,324 bushels in 1879, proportioned as follows:

Crops.	1870.	1880.
Wheat	75,650	540,589
Rye	1,750	4,341
Oats	100,119	468,206
Indian corn	5,750	16,408
Buckwheat	.....	.....
Barley	72,316	274,750
Totals	255,591	1,298,894

The pasturage lands of Idaho cover a large proportional area, especially in the southern part. With the exception of the more desert parts of the Snake River Plains, all the level country is available for pasturage. To this should be added also the mountain ranges of the southern and southeastern part, which

contain little timber and are covered with bunch grass. Most of the ranges of the Territory are practically untouched; although now cattle are being brought over from Oregon and Washington, and the Territory will soon be stocked by the overflow from the neighboring country. In 1880, the Census reported 209,000 cattle, 62,900 sheep, and 16,300 swine.

The surface geology of the Territory is quite varied. The valleys of the southern part are very largely floored with basalt, which has either flowed down them, as in the cases of the Bear, Blackfoot, and Portneuf valleys, or has run up into them from the Snake River Plains. The other valleys of this section are covered with Quaternary or Tertiary deposits; while the ranges are mainly made up of Silurian and Carboniferous rocks. North of the Snake River Plains, the mountains are mainly composed of metamorphic rocks. Little is known, however, of the geology of this part of the Territory.

Its mineral resources are as yet but slightly developed; although mines have been worked in certain parts of the Territory for twenty years. Those of the Owyhee district, in the southwestern corner, were for a time very productive. In various portions of the Salmon River Mountains, a number of valuable metalliferous deposits have been discovered. The most promising field for mining operations, perhaps, in the country at present, is what is known as the Wood River District, on the southern slope of this range, at the headwaters of one of the branches of the Malade river. The deposits have but recently been discovered, and hence little development has been effected; but, from the surface indications, many of the leads are very valuable. The production of the Territory for the year 1879, was $2,091,300, the greater part of which was silver. The production for 1880 was slightly less; being given as $1,894,747, about three-fifths of which was silver.

Until within two years, Idaho had not a mile of railroad within its limits, but was dependent upon mule and "bull" teams for all its transportation. Since then, the Utah & Northern Railroad has been built across the southeastern part of the Territory, on the route from Ogden, Utah, to Helena, Montana. A branch is projected, if it is not already in progress of construction, from some point on this road, probably Blackfoot Station, to Boisé City, passing through or near the celebrated Wood River Mining District. The intention is to carry this road

through to the Columbia river. With the completion of this railroad we may expect a rapid growth of the Territory.

Manufactures are very limited, and are confined chiefly to the production of flour, the smelting of ores, and the sawing of lumber. Of the extent of these industries, the Tenth Census furnishes the following statistics:

Business.	Number Establishments	Capital.	Hands Employed.	Amount Paid in Wages.	Materials.	Products.
Flouring & grist mill products.	10	$287,000	49	$17,855	$451,670	$544,620
Lumber, sawed	48	192,460	344	91,256	148,641	394,805
Ores smelted	....	.....	.....	.....	.....	.....

The population of Idaho by the last Census was 32,611, an increase of 17,612, or 117 per cent., over that in 1870. The population by counties is as follows:

Ada	4,674	Lemhi	2,220
Alturas	1,698	Nez Percé	3,965
Bear Lake	3,235	Oneida	6,965
Boisé	3,214	Owyhee	1,426
Cassia	1,812	Shoshone	469
Idaho	2,031	Washington	879
Kootenai	518		

The principal settlements are, Boisé City, the capital, Idaho City, Lewiston, Silver City, Malade City, and Florence.

The largest proportion of the population is engaged in mining. In the southeastern part, the area drained into the Great Salt Lake, consisting mainly of Cache and Malade valleys, is almost entirely peopled by Mormons, who are engaged principally in farming. They are grouped in small towns, around which spread their farms.

In 1880 the Territory contained but one National bank, located at Boisé City, and two private banks.

From the Census returns for 1880, are taken the following statistics regarding the valuation, taxes, etc.:

Total assessed valuation	$3,406,089
Territorial tax	109,451
County tax	31,057

It is estimated that the assessed valuation is about two-thirds of the true valuation. The latter, on this basis, is about $9,612,000.

The Indians located within the Territory are principally of the following tribes: Nez Percés, Bannacks, and Shoshones. The former have a fine reservation of 1,344,000 acres on the Clearwater river, toward the northern part of the Territory. The number of Indians inhabiting this reservation is stated as 2,807. The two latter tribes jointly occupy a reservation in the southeastern part, on the Snake and Portneuf rivers, of 18,000 acres. These Indians are reported, in round numbers, as 1,500; there is also a small reservation near Lemhi, in the Salmon River Mountains, where 677 Indians are reported as having their home.

CHAPTER XIX.

TERRITORY OF UTAH.

THE Territory of Utah lies between the parallels of latitude of 37° and 42°, and the meridians of longitude of 32° and 37° west of Washington. In shape, it is nearly a rectangle; but from the northeastern corner, Wyoming has cut a piece two degrees in breadth east and west, and one degree from north to south. The area, computed carefully from its known dimensions, is 84,970 square miles. Its mean height above the sea is 6,100 feet. Its surface is thus distributed between the thousand-foot curves of elevation:

Elevation, ft.	Square miles.	Elevation, ft.	Square miles.
4,000 to 5,000	21,100	9,000 to 10,000	2,500
5,000 to 6,000	25,200	10,000 to 11,000	1,400
6,000 to 7,000	19,600	11,000 to 12,000	600
7,000 to 8,000	9,570	12,000 to 13,000	200
8,000 to 9,000	4,800		

The eastern and southern parts of the Territory are drained by the Colorado, through a marvelous system of cañons and plateaux. The remainder is a part of the Great Basin, whose waters have no outlet save evaporation.

A series of high mountains and plateaux traverses Utah from its northern to its southern border. The Wahsatch Mountains constitute the northern part of this series, rising in their peaks to 12,000 or 13,000 feet above the sea. The southern portion is formed by the High Plateaux, which extend in an unbroken series southward to the Grand Cañon of the Colorado river, with heights ranging from 8,000 to 11,000 feet. Eastward from the Wahsatch, in the northern part of the Territory, stretches the Uinta Range, a high, broad, plateau-like mass, with many peaks projecting above it. Some of the latter rise to nearly 14,000 feet above the sea.

Southward from the Uintas lie in succession two inclined plateaux, sloping gently to the northward and breaking off abruptly towards the south. The cliffs at the southern face of

the southern one are the well-known Book or Roan Cliffs, which extend far eastward into Colorado.

The Uinta Mountains, and both these plateaux, are traversed at right angles by Green river, forming a succession of tremendous gorges.

South of the Book Cliffs, and east of the High Plateaux, is the Cañon Land, a desert, almost void of animal and vegetable life, but peopled with strange and grotesque forms carved in solid rock by the rains and the winds. In this land the surface is waterless; all the streams, and they are few in number and contain little water, are buried thousands of feet below the surface, in canons, where, perhaps, the sunlight never penetrates. In this region the Green and Grand rivers unite to form the Colorado, which follows its course thereafter for many hundreds of miles, at 3,000 to 7,000 feet below the level of the plateaux. Every stream entering it in this region is in a canon; and, besides these living streams, there are thousands of dry canons cutting the country in every direction, merely cast-off shells of once living streams. Their name is legion; and they make of the country a skeleton.

West of this elevated central region, is a broad extent of arid valleys, separated by narrow, abrupt ranges, all trending north and south, and scarcely less arid than the deserts which they overlook. This a part of the Great Basin, that great interior region which has no outlet for its water to either ocean. In reality, it consists, not of *one* great basin, but of a great number. Every valley is a sink for its own waters. The little streams trickling down the arid mountain side sink in the sand at its base, or, perhaps, flow off into some salt lake or lagoon, there to be returned to the clouds by evaporation. The largest of these sinks is the well-known Great Salt Lake, 83 miles in length by 53 miles in width, and covering an area of 2,290 square miles in 1872. The water is nearly a saturated brine, containing one part of salts to five of water. It is so salt that only the lowest forms of animal life can exist in it. This lake collects the water from the whole western slope of the Wahsatch Range.

The climate of Utah is arid. On the mountains of the Wahsatch and Uinta, and the High Plateaux, there is an abundant rainfall; and, in the spring and summer, vegetation is luxuriant there. But these are the highlands, above the possibility of cultivation. In the valleys and on the plateaux and deserts the

rainfall is very light, as shown by the following table, abstracted from Maj. Powell's able report on the "Arid Lands of Utah:"

Stations.	Rainfall, in Inches.				
	Spring.	Summer.	Autumn.	Winter.	Year.
Camp Douglas, Utah	7.20	2.18	3.24	6.20	18.82
Salt Lake City, Utah	6.25	6.28	4.71	7.57	24.81
Camp Halleck, Nev	3.66	1.19	2.31	3.82	10.98
Fort Bridger, Wyo	2.99	2.05	1.68	1.71	8.43

The two last stations, though not within the Territory, are quite near the boundary line; and the data from them may be taken as illustrative of that part of the Territory near them.

As the least amount of rainfall which is sufficient for the majority of crops is about thirty inches per annum, it follows, that, as everywhere in this region, irrigation is universally necessary for successful agriculture.

The temperature ranges, with the latitude and altitude, through wide limits. In the settled valleys, however, it is mild, both winter and summer; and a more delightful climate can not be imagined. At Salt Lake City, the extreme range is from 95° in the summer to —8 in the winter. In Cache valley the climate is somewhat colder, as the latitude and elevation are greater; while southward it is warmer, reaching an almost tropical climate in the valleys of the Rio Virgen. The dryness of the atmosphere is even greater than in Colorado; and its peculiar effects are much more marked. The general surface geology of the Territory is not complicated.

The Wahsatch Range and its western foot-hills are Eozoic. The Uinta, trending eastward from its junction with the Wahsatch, is mainly Carboniferous, with more recent beds tilted up on its flanks. The plateaux of the eastern part are of the more recent formations,—Tertiary, Cretaceous, and Jurassic—while the enormous canons have cut sections through the strata down, in some localities, even to the granite. West of the Wahsatch, the parallel ranges of the desert are, in general, of the older formations; though they exhibit great variety in age, as well as structure. The desert valleys are deeply covered with the most recent deposits.

The fauna of Utah is poor and sparse. Even in the mountains, game is very scarce; and, on the plateaux and in the desert valleys, only those forms peculiar to an arid region are found. Coyotes, centipedes, lizards, and owls may well be taken as representatives of the animal life.

The flora is equally characteristic. On the mountains and high plateaux, there is an abundance of fine coniferous timber, while the openings are carpeted with luxuriant bunch grass. Several of the higher valleys, too, make excellent grazing grounds. But the lower plateaux and the valleys of the western part, fall under the general condemnation. Artemisia is their most valuable product; and many great areas are destitute of all vegetation.

The history of Utah since 1847, is the history of the Mormon Church, or, as this people prefer to call themselves, the Church of Latter-day Saints. The Territory was a part of the area ceded to the United States by the treaty of Guadalupe Hidalgo, in 1848. Utah, as originally constituted, comprises an area of more than 220,000 square miles, which has since been cut down by portions given to Colorado, Nebraska, and Nevada.

Up to 1847, it was practically unsettled, and only a few hunters and trappers had found their way within its limits. The only information which the world possessed concerning it was from the semi-trapping, semi-exploring expedition of Capt. Bonneville, and from the highly colored narratives of those old romancers, the Jesuit Missionaries.

In 1847 and 1848, the Mormons, expelled from Nauvoo, Ill., made their way to the valley of Great Salt Lake, and there settled; although it was at the time, apparently, one of the most desert portions of the country. Their selection of this spot was undoubtedly due to its similarity, in certain respects, to the land of Canaan. The resemblance of the Great Salt Lake to the Dead Sea, Utah Lake to the Sea of Tiberias, with the River Jordan connecting them, furnished a coincidence sufficiently remarkable to indicate to them that the hand of the Lord had guided them to this place.

They had many troubles in founding their infant colony. The first year starvation stared them in the face; but thereafter they had abundant crops. Their Indian neighbors at first caused them much trouble; but, by a wise policy, they soon gained

their confidence; and latterly they have had little trouble with them. The Mormons increased rapidly, both by natural increase and by proselyting, and spread over most of the fertile parts of the Territory. Their attitude towards the United States has been, for the most part, hostile; though they have always avoided an open rupture. More than one band of emigrants have, however, been massacred by them, or by Indians at their instigation. Of late years, however, as the power of the United States has become more firmly established in the Territory, and as the "Gentile element" has become greater in their midst, the utterances of their chief men have become milder and less demonstrative. Up to the year 1854, Brigham Young, the head of the Mormon Church, was the Territorial governor—since then, the temporal government has been in the hands of Gentiles, appointed by the president of the United States.

The Mormon population is very largely a foreign one, or of direct foreign descent. The proselytes are mainly from the peasant classes of England, Wales, Germany, and Scandinavia; and thousands are added every year to their number from this source. Add to this the natural increase (and Mormon women are very prolific), and it is not strange that this peculiar people is rapidly increasing in number.

The community is largely an agricultural one. Farming is usually prosecuted on a small scale, as few of the people possess much property. Accumulation of this world's goods, excepting in the hands of a few of the church leaders, has never been countenanced by the rulers of the church; and the system of tithes, i. e., an annual income tax of ten per cent., is admirably calculated to prevent undue accumulation of wealth. Still, very many of the people are in comfortable circumstances. They own good farms, large enough to support their large families comfortably. Many of them have handsome houses, constructed of the blue limestone common in the Wahsatch Range.

Communism in business matters is a common feature among them. Most of the wholesale and retail trade throughout their settlements is monopolized by one large company, known as "Zion's Co-operative Mercantile Institution." There are also many large co-operative irrigation, farming, and dairying companies. The policy of the church has always been to discountenance mining within the Territory; as the shrewd,

far-sighted leaders saw that this interest would at once bring upon them a cloud of Gentiles, of the most objectionable stamp.

Altogether, the Mormon people, considered apart from their peculiar beliefs, and especially their belief in and practice of polygamy, is one of the best that could be obtained to settle our unoccupied territory. They are (I refer to the mass of the people, not the leaders) honest, sober, simple, and industrious. Ignorant and bigoted they may be; but that is a fault that is easily corrected. Take away from them the domination of the Mormon priesthood, and they will form a very valuable element of our population.

Since the completion of the Pacific Railroad, in 1870, Gentiles have emigrated to Utah in considerable numbers; and at present they form probably about one-fifth of the total population. Most of them are in Salt Lake City, Ogden, and the other principal cities of the Territory, where they form a powerful element. The greater part of them are engaged in mining and commerce; comparatively few in farming.

The irrigable lands of Utah are estimated by Major Powell at but 2.8 per cent. of the area of the Territory. I am inclined to disagree with this well-known authority, and to assign a much higher value to the arable land of the Territory. Using reservoirs, and economizing the water to the utmost extent, I am persuaded that nearly six per cent. can be brought under irrigation, or nearly one-sixteenth of the entire area of the Territory.

The arable lands lie mainly in the region drained by the affluents of Great Salt and Sevier Lakes. Most of the valleys on the Colorado river and its tributaries, excepting the great valley of the Uinta, and that of the San Rafael, are small, and of little consequence. The Uinta valley, lying at the south base of the Uinta Mountains, contains, probably, 500 square miles of irrigable land; that of the San Rafael, at least 300 square miles.

In the northern part of the Territory, the valleys watered by the Bear river and its tributaries, including Cache valley, "the garden of Utah," can be irrigated throughout; while the strip of land along the west shore of Great Salt Lake is abundantly watered by the numerous springs which break forth from the base of the Wahsatch Range. Nearly all of the valley lying south of the Great Salt Lake, as far as the head of Utah

Lake, can be watered from that lake and the numerous streams from the Wahsatch Mountains. Farther south, a considerable portion of the valleys of the Sevier can be watered by that stream; but the latter is by no means sufficient for the reclamation of all the area of its valleys.

In the western portion of the Territory, there is practically no water; and the desert valleys must forever remain desert, unless some great climatic change should intervene. The amount of land under irrigation in 1877, was ascertained by Major Powell to be 494.1 square miles, or 316,224 acres.

The table below gives the principal cereal products of Utah in 1859, 1869, 1879, as shown in the Census tables of 1860, 1870, 1880:

Crops.	1860.	1870.	1880.
Wheat	384,892	558,473	1,169,199
Rye	754	1,812	9,605
Oats	63,211	65,650	418,083
Indian corn	90,482	95,557	163,343
Buckwheat	68	178	.....
Barley	9,976	49,117	217,140
Totals	549,383	770,287	1,977,368

The grazing interest is not as important, proportionally, as in the neighboring States and Territories. This is due in part to the conditions of settlement and the genius of the people, in part to the comparatively small amount of land suitable for this purpose. The Census of 1880 returns 175,000 cattle, 495,000 sheep, and 4,000 swine.

The mining industry is mainly confined to the Gentiles. Very few Mormons have embarked in it. The mines thus far discovered and worked are in the Wahsatch Mountains, east and southeast of Salt Lake City. The metal found is almost entirely silver, and the ores are mainly galena and chlorides of silver, and the deposits are in the form of fissure veins.

During the year 1879, the production of Utah was $5,468,879, all but $211,640 of which was silver, the remainder being gold. The production in 1880 was $6,450,958, an increase of nearly a million.

Of coal, the principal sources of supply are the deposits in the valley of the Weber river. In this valley there are a number of openings or beds of a good quality of Tertiary or Cretaceous coal, which, although soft and lignitic, answers well for nearly

all purposes, excepting for use in smelting furnaces. It is reported that large deposits of bituminous coal, in the Upper Coal Measures, have been discovered in Castle valley, and in the canons of Grand and Green rivers. The total production of coal in the Territory in 1879, was reported as 225,000 tons. Iron ores, also, are reported to exist in immense quantities in various parts of the Territory.

The population of Utah by the last Census (1880) was 143,907, of which 74,471 were males, and 69,436 were females; 99,974 were native born, and 43,933 foreign born. The following is the population by counties:

Beaver	3,918	Salt Lake	31,978
Box Elder	6,761	San Juan	204
Cache	12,561	San Pete	11,557
Davis	5,026	Sevier	5,139
Emery	556	Summit	4,240
Iron	4,013	Tooele	4,497
Juab	3,478	Uinta	799
Kane	3,085	Utah	17,918
Millard	3,737	Wahsatch	2,927
Morgan	1,783	Washington	4,235
Piute	1,651	Weber	12,597
Rich	1,263		

The railroad system has not yet been highly developed; yet, since the construction of the Union and Central Pacific Railroads across the northern part, considerable progress has been made. From Ogden, a road has been built northward and eastward into Cache valley, as far as the Territorial line. Southward from the same point, a road runs to Salt Lake City, and thence south by connections, into the southern part of the Territory.

The following figures show the extent of the lumber and flouring interests in the Territory:

Business.	Number Establishments	Capital.	Hands Employed.	Amount Paid in Wages.	Value of Materials.	Value of Products.
Flouring & grist mill products	93	$649,950	265	$ 90,013	$1 257,484	$1,531,738
Lumber mills	98	223,750	584	129,849	208,518	444,843

The class of people inhabiting Utah is not one to encourage railroad building. Each little hamlet is almost entirely self-supporting, and has little to export. Again, they are not, like the average American, a migratory people.

There are now 770 miles of railroad in Utah, of which 546 are here tabulated:

Railroads.	Miles Worked.	Cost Per Mile.
Union Pacific, medium gauge	71.5	$113,200
Central Pacific, medium gauge	151.6	119,459
Utah Central, medium gauge	89.5	68,499
Utah Southern and extension, medium gauge	168.0	35,000
Utah & Pleasant Valley, medium gauge	60.0	30,000
Utah & Northern, narrow gauge	80.0	24,000
Salt Lake & Stockton, narrow gauge	27.0	.....
Wahsatch & Jordan Valley, narrow gauge	44.0	.....
Summit County, narrow gauge	7.5	.....
Total miles	546.1	.....

Salt Lake City, the capital and principal city of the Territory, stands on the bench land, a few miles south of the south shore of Great Salt Lake, and at the western base of the Wahsatch Range. It is a beautiful city, even if seen by Eastern eyes; and, when contrasted with the gray waste of sage brush stretching around it, the effect is doubly pleasing. It is regularly laid out, with broad streets, shaded by rows of trees, and watered by little streams on each side. Excepting in the business portion, the houses have ample grounds, planted as orchards or gardens. The features of the city are the great Mormon Tabernacle, which will seat 8,000 people, and cost $500,000; the magnificent temple which is now nearly completed; and the former residences of the late Brigham Young. It has gas, street railways, and a fine system of graded schools, including the University of Deseret.

The place of next importance is Ogden, at the junction of the Union and Central Pacific, the Utah Northern, and Utah Central Railroads. It is a rapidly growing place. Besides being an important railroad centre, it is in the midst of a rich agricultural region.

Much attention has always been paid by the Mormon priesthood to education. In 1875, there were in the Territory 260 school houses, in which 398 teachers were employed. Out of a total school population of 33,168, the average daily attendance was 12,916.

There is one so-called "University," that of Deseret, located at Salt Lake City. It was organized in 1879, but has not yet developed more than a preparatory department. In 1875, it had eight teachers and 179 students. It is wholly under Mormon management.

By far the larger proportion, probably at least four-fifths, of the inhabitants of Utah, are Mormons; and nearly all the church property is theirs. The rest are distributed among other religious denominations, including Episcopalians, Methodists, Presbyterians, and Baptists, in the above order. In 1875, there were twenty newspapers published in Utah, of which five were dailies. Of these, four were published in Salt Lake City. In 1880, there were in the Territory three National banks, with a total capital of $200,000, and outstanding circulation amounting to $192,544, besides eleven private bankers, using $206,000 capital.

From the returns of the Tenth Census, the following figures regarding the valuation and taxation of the Territory are taken:

Total valuation (assessed)	$24,985,072
Territorial tax for general purposes	74,958
Territorial tax for school-support	74,958
School district tax	67,326

No county tax is levied for school support. These taxes are exclusive of and additional to the system of tithes which the Mormon church collects from all its devotees.

The progress of Salt Lake City in population since 1860, the total assessed value of real estate and personal property, the estimated true value of the same, the total tax levy, and the total debt in 1880, is shown as follows:

Cities.	Popul'n 1880.	Popul'n 1870.	Popul'n 1860.	Total Assess'd Value of Real Estate and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of Real and Personal Property.	Taxation. Total Levy	Total Debt.
Salt Lake City	8,807	12,854	20,768	$7,804,525	$7,746,131	$10,326,174	$194,174	$97,000

There are but few Indians in the Territory; and, excepting the Uinta Utes, most of them are of a low type. The Uinta Utes, numbering 430, occupy a large reservation on the Uinta river, at the south base of the range of the same name. Besides these, there are a few small bands allied to the Shoshones, and popularly known as "Diggers." They are found scattered over the plateaux in the south and east, and in the desert valleys of the western part of the Territory. A few Bannacks, who have been converted to Mormonism, lead a semi-nomadic life, in the northern part, about the head of Great Salt Lake. The total number in the Territory is estimated by the Indian office at 820; but this is probably far below the truth.

CHAPTER XX.

TERRITORY OF NEW MEXICO.

THE traveler in New Mexico feels that he is in a foreign land. Nearly all of the people are of Spanish descent, speak the Spanish language (though by no means pure Castilian), and have the manners and customs of the Spanish of two or three centuries ago, mingled with those of the semi-civilized Pueblo Indians, with whom they jointly possess the soil. The people, both Mexican and Indian, are ineffably lazy and shiftless; and the country, under their control, has remained stationary for centuries. The progress of railroad building is now, however, bringing into the Territory a large American element, which is already making itself felt very decidedly in opening up the resources of the Territory, and especially its mineral wealth.

New Mexico lies between the parallels of 31° 20′ and 37° north latitude, and the meridians of 26° and 32° west of Washington. On the north it is bounded by Colorado, on the east by Indian Territory, on the south by Texas and Mexico, and on the west by Arizona.

It was a part of the territory ceded to the United States by Mexico, under the treaty of Guadalupe Hidalgo, and by the Gadsden purchase. Its discovery and exploration antedated that of any other part of the country excepting the Gulf States. In 1537 to 1540, the region was penetrated and the natives conquered by Vasquez de Coronado, a Spanish adventurer, who entered the country from Mexico at the head of a small army. At that time the principal inhabitants consisted of a semi-civilized people, living in communal towns of stone or adobe brick. These are the Pueblo Indians of the present day.

Towards the close of that century the country was colonized with Spaniards, who enslaved the inhabitants of the Pueblos, and treated them with the utmost harshness. Many attempts at revolt followed, but without success, until 1680, when they

succeeded in driving the Spaniards out of the country, and maintained their independence for eighteen years. In 1698, they were reconquered, and remained under the Dominion of Spain until 1822, when, joining with the other States of Mexico, they succeeded in throwing off the Spanish yoke.

The Territory, as originally organized under the United States, comprised, besides what is now New Mexico, all of Arizona and part of Colorado. Arizona was set off in 1863, and the part of Colorado in 1865.

During the late civil war, New Mexico was invaded by the rebels, under command of Gen. Sibley, who defeated some raw levies of Mexican militia, and occupied Santa Fé. Marching northward, with the intention of invading Colorado, he was met by a body of Colorado volunteers, when a drawn battle ensued; after which the rebel commander, finding it impossible to sustain himself, and being threatened constantly by large bodies of the Federals, was forced to retreat into Texas, with a loss of one-half of his command.

The growth of the Territory, until recently, has been very slow. Until within a year or two, there has been almost no immigration, and the increase has been confined almost entirely to natural growth. The Territory has now taken a vigorous start; and we may look for a very rapid increase in population and wealth.

The area of New Mexico is 122,580 square miles. Its mean elevation above the sea is placed at 5,600 feet. Its lowest point probably is near El Paso, on the Rio Grande, which is 3,800 feet above the sea; while its mountain peaks reach nearly to 14,000 feet. The elevation of its surface is indicated in the following table:

Elevation, ft.	Square miles.	Elevation, ft.	Square miles.
3,000 to 4,000	2,000	8,000 to 9,000	5,000
4,000 to 5,000	53,000	9,000 to 10,000	3,200
5,000 to 6,000	26,200	10,000 to 11,000	1,800
6,000 to 7,000	22,180	11,000 to 12,000	700
7,000 to 8,000	6,500		

Nearly one-half of the area of the Territory is between 4,000 and 5,000 feet above sea level.

New Mexico has a very varied, uneven surface, with great extents of plains, broken by small ranges and groups of mountains. The northeastern portion consists of a part of the great plains. South of the Canadian river, these rise into the

great plateau known as the Llano Estacado, which ranges in elevation from 8,500 to 5,000 feet. The surface is grassy, but is almost absolutely without water. West of this plateau is the narrow, fertile valley of the Pecos, between which and the Rio Grande the country is mainly dry and sterile, while water is extremely scarce. The surface is nearly level, but is broken here and there by a few groups and short ranges of low mountains, themselves nearly as sterile as the desert at their bases. The Sangre de Cristo range, which in Colorado has an elevation of about 14,000 feet in many of its peaks, extends southward half way through New Mexico, with a gradual diminution of altitude, separating the plains on the east from the valley of the Rio Grande on the west. The northern part of the Rio Grande valley consists of the southern portion of the San Luis park, or valley, the greater portion of which is embraced in Colorado. In this Territory, the soil of this valley becomes yet more sandy, and the vegetation sparser and more desert-like than in Colorado. At its foot the valley is terminated abruptly by an outflow of volcanic rock, through which the river has carved a narrow course. Below this canon the river has a narrow valley, which extends down to Fort Craig. Thence it is in canon, or a very narrow valley, beyond the limits of the Territory.

West of the Rio Grande, in the northern part, the great Southern spur from the San Juan Mountains of Colorado enters the Territory, and extends southward in a broad mass as far as latitude 35° 30'. The rest of this western half of the Territory consists of plains and plateaux, broken by numberless ranges and groups of mountains, some of considerable height. Among them the range known as the Zuni Mountains is perhaps the most important, rising to a mean height of about 12,000 feet. These plains and plateaux are for the most part covered with grass, but become more arid and desert-like toward the northwest. The higher mountains are everywhere covered with forests of coniferæ.

The rivers of the Territory are few and unimportant for other purposes than irrigation. The Canadian heads in the eastern slopes of the Sangre de Cristo Range, and flows off to the eastward. The Rio Grande, which is by far the largest stream, heads in the San Juan Mountains, in Colorado, and pursues a course nearly due south down the Territory. It receives nearly all

its supply of water from the mountains about its head, and is joined by no tributary of any magnitude in its long course through New Mexico. Indeed, the net result of its journey across this Territory is a considerable loss of water owing to evaporation and sinking in this arid region. It has been known to sink entirely into the sands of its bed, in the southern part of the Territory. In the southwestern part are the sources of the Gila, and, farther north, those of the Colorado Chiquito, both of which are branches of the Colorado of the West.

The leading feature of the climate is its aridity, which, owing to its more southerly position and less altitude, is much greater than that of Colorado. The mean annual temperature ranges from 45° to 64° in the plain and valley portions, decreasing, of course, on the mountains. The rainfall in the valleys and on the plains is very slight, ranging from eight to twenty-two inches annually, an amount nowhere sufficient to produce any useful crops, except the grasses, without irrigation. Snow very rarely falls, except on the mountains; indeed, a fall of four inches, in the level country, in the winter of 1880–81, was a phenomenon almost unprecedented.

With so arid a climate, it is a singular fact that New Mexico has very little desert land; nearly all the plains and plateaux are covered with gramma grass, that most nutritious of food for cattle and sheep. While there is an abundance of sage brush for all practical purposes, it does not, as in other parts of the West, even in those which are much less arid, crowd out the useful grasses.

The higher mountains are covered with forests; but they are by no means so extensive as in Colorado; nor do they furnish as large or as valuable timber. Some of the plateaux are partially covered with pinon pine and a stunted species of cedar, both of which trees are peculiar to an arid climate and are of little economic value.

Throughout the Territory, large game is scarce. The species found are not characteristically different from those of Colorado, excepting that those peculiar to an arid climate become relatively more abundant. The short, sharp bark and prolonged wail of the coyote are heard more frequently; and the traveler must take greater heed to his steps to avoid treading upon rattlesnakes.

The climate of New Mexico is adapted to the growth of all

cereals and fruits of the temperate zone. Corn, which can be cultivated in only a few localities in Colorado, can here be ripened almost anywhere.

The extent of arable land being here, as almost everywhere in the West, a question of water, it is thereby limited. The utmost amount possible to place under irrigation, by utilizing all the contributions of the streams with the utmost economy, is estimated to be not more than five per cent. of the area of the Territory, or 6,060 square miles. This is distributed along the bases of the higher ranges of mountains and the valleys of the few streams of the Territory. Agriculture will probably never be a leading industry of New Mexico. It will be, as now, far eclipsed by the grazing interest, which, even under the lazy Mexican régime, is a large and important industry. In 1880, there were in the Territory no less than 400,000 head of cattle and 5,000,000 sheep. The climate is so mild that neither cattle nor sheep require shelter or feed during the winter.

The table below presents the statistics of cereal products of New Mexico in 1859, 1869, and 1879, as given by the Census Bureau:

Crops.	1860.	1870.	1880.
Wheat	434,309	352,822	706,641
Rye	1,300	42	240
Oats	7,246	67,660	156,257
Indian corn	709,304	640,823	633,786
Buckwheat	6	10	.....
Barley	6,099	3,876	50,053
Totals	1,158,264	1,065,233	1,546,977

The surface geology of the Territory is quite complicated; and to give a sketch of it in any way approaching detail would far transcend the space allowed in this work. More than half of the Territory, including the Llano Estacado, the plains, and a large proportion of the plateau region, is covered by the Cretaceous formation. In many of the canons of the latter, the Trias, and even the Jura, is exposed. The plateaux of the southwestern portion are Eozoic, as are also most of the mountain ranges of the Territory, with the earlier stratified formations exposed at their bases and on their flanks. There are outbursts and fields of volcanic rock covering considerable areas at the

foot of San Luis valley, between the Rio Grande and the Guadalupe Mountains, and in the western part, about Mount Taylor.

Under the old Mexican and Indian régime, little was done toward a development of the mineral resources of the Territory. The comparatively small white population, which has been but slowly increasing since the acquisition of the Territory by the United States, has been hampered very much in this direction by the countless land grants which have been continually cropping up to disturb and invalidate titles. The grants appear to be of two kinds; those which, in terms, convey the minerals to be found on the grant, and those which do not. The latter form by far the larger proportion of the whole; and recent rulings of the courts are to the effect that they do not cover mineral land, even if it be included within the limits of the grant. It is unnecessary to say that these decisions are supported heartily by the Anglo-Saxon element of the population. There is no longer any danger threatening the titles to mineral lands, from an unconfirmed grant of this class.

From this and other causes, among them the great interest in mining which has recently arisen, and the extension of railroads into the Territory, the development of the mineral wealth of New Mexico has been commenced in earnest, and with the most flattering results. The Territory contains a number of very rich placers, among them the "Old" and "New Placers," which have been worked in only a small way, owing to a scarcity of water and want of capital. The latter is now forthcoming; and great works are in progress to bring water from a distance to these deposits.

Thousands of mineral lodes have been discovered and located; and many are already being worked with profit. The most productive district at present is probably that of Silver City. toward the southwestern part of the Territory.

The total production for the year 1879 is estimated by Wells, Fargo & Co. as—gold, $19,800; silver, $603,000. In 1880, they report a total of $711,300, nearly all of which is silver.

Besides the precious metals, New Mexico is destined to be a large producer of copper. Several rich mines of this metal have been discovered, and are now being worked. Among them is one on the San Pedro Grant, which consists of a bed thirty feet in thickness of ore which runs about fifteen per cent. of copper.

Until within a year or two, the Territory was without railroads. Now, at the beginning of 1881, the Atchison, Topeka & Santa Fé road, entering at the north, over the Raton Hills, has traversed two-thirds of the width of the Territory, following generally the course of the Rio Grande. The Southern Pacific Railroad, coming from the west, has reached a junction with the former. Other roads are projected, which, if completed, will afford easy communication with all parts of the Territory.

In 1880, the Territory contained four National banks, with a total capital of $400,000 and an outstanding circulation of $355,670, and five private bankers.

The population of the Territory is 119,563, of which 64,499 are males, and 55,064 females. Of the total number, more than one-half are Mexicans, and about 9,000 are Pueblo Indians, who, by the terms of the treaty of Guadalupe Hidalgo, are American citizens, although still under tribal organization. The population by counties is as follows:

Bernalillo	17,225	San Miguel	20,628
Colfax	3,398	Santa Fé	10,367
Dona Ana	7,612	Socorro	7,875
Grant	4,589	Taos	11,028
Lincoln	2,513	Valencia	13,006
Mora	9,751		
Rio Arriba	11,022	Total	119,563

The principal city is Santa Fé, the capital of the Territory, which was settled in the sixteenth century, and is, therefore, one of the oldest cities in the country. It is situated twenty miles east of the Rio Grande, on Santa Fé creek, at the base of the Sangre de Cristo range, and at an elevation above the sea of about 7,000 feet. The population in 1880 was 6,635.

Other settlements of some importance are Las Vegas, Silver City, and Albuquerque.

Several of the pueblos are important places, containing a thousand population or more.

Besides the Pueblo Indians, who possess a degree of civilization but little inferior to that of their Mexican neighbors, there are in the Territory a large number of Indians proper. In the northwest is the large tribe of Navajos, numbering 11,850; farther east are the Jicarillo Apaches, 627 in number; and on or about the Pecos river, in the eastern part, are the Mescalero and Hot Spring Apaches, numbering 1,350. Besides these, there are small bands of wandering Indians, more or less hostile, whose numbers can not be estimated, but are known to be small.

The following table of the wealth, debt, and taxation of the Territory is from the report of the Tenth Census, and relates to the year 1880:

Real estate (assessed valuation)	$2,706,478
Personal property (assessed valuation)	3,983,216
Total assessed valuation	6,689,694

This is estimated to be about 50 per cent. of the true valuation, which is, approximately, $13,379,388.

County debt	$34,793
County tax, general purposes	42,090
County tax, school purposes	17,081
State tax, general purposes	40,894

The following statistics show the importance of the flouring and lumber business:

Business.	Number Establishments.	Capital.	Hands Employed.	Amount Paid Per Annum in Wages.	Value of Materials.	Value of Products.
Flouring & grist mill products	55	$255,425	146	$ 42,330	$537,295	$680,720
Lumber mills	24	69,500	184	87,726	104,650	198,500

New Mexico is now just awaking from its sleep of centuries, and with the influx of American blood and enterprise, its great resources, which, under Spanish domination, have laid untouched, are being rapidly brought to light, and the Territory will, ere long, occupy the place in the sisterhood of States, to which it is entitled.

CHAPTER XXI.

TERRITORY OF ARIZONA.

THIS, the most remote and inaccessible of all the Territories, has long been neglected by the settler, whether miner, stock raiser, or farmer. Besides its inaccessibility, the Territory has been infested, in its fairest parts, by hostile Apaches, by whom the wave of immigration, never very powerful, has been repeatedly turned back. With its neighbors, however, Arizona is now beginning to grow and develop with the extension of railroads, the suppression of Indian hostilities, and the immense interest recently awakened in mining investments. Settlers of all classes and conditions are following the Southern Pacific Railroad into this "promised land," mines are being opened in all parts of the Territory, and stock raisers are finding rich and virgin fields of pasturage.

Arizona is one of the Southwestern Territories. It lies between the parallels of 31° and 37°, and the meridians of 109° and 115° west longitude. Its limits are, on the east, the meridian of 32° west of Washington, where it borders on New Mexico. On the south, it has a broken boundary bordering on Mexico; on the west the Colorado river separates it from Southern California; and, on the north, the parallel of 37° separates it from Utah. Its area is 113,020 square miles.

Arizona is a part of the territory ceded to the United States by Mexico by the treaty of Guadalupe Hidalgo and the Gadsden purchase. By the former the boundary between the two countries was the Gila river. The latter gave us the tract lying south of that river.

Its history is brief. Its first exploration was made by Vasquez de Coronado, who traversed a portion of it in his celebrated expedition in search of the seven cities of Cibola. One of his parties appears to have traveled up the Colorado river for a long distance, perhaps nearly to the foot of the Black Cañon. With his main body of adventurers, he visited and conquered

the Moquis towns, situated on the high mésas in the northern part; and thence succeeded in reaching the wall of the Grand Cañon of the Colorado, near the mouth of Cataract creek. Following Coronado, several parties of Jesuit friars traversed the Territory, to and from California; and many of these enterprising, devoted men settled with the more tractable tribes of Indians on the Gila and the Colorado, and succeeded in Christianizing, and in a measure civilizing, many of them. When we came into possession of the country, we found a sparse Mexican population scattered over the southern part, about the Gila and its southern branches, of which Tucson was the metropolis. Between 1850 and 1860, the Territory was traversed by a number of parties engaged in exploring for routes for a Pacific railroad. The Territory was a part of New Mexico until 1863, when it was set off by itself under a Territorial government.

The surface of the Territory is very much diversified. A large proportion of it consists of arid plateaux; while the balance is divided between desert plains, narrow ranges of mountains, and valleys.

The mean height of the Territory above sea level is 4,300 feet. In the southwestern part, it falls to sea level; while its highest peak, Mount San Francisco, rises to 12,052 feet. The area of the Territory is distributed in elevation as follows:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
From sea-level to 1,000	8,000	6,000 to 7,000	21,700
1,000 to 2,000	11,200	7,000 to 8,000	5,000
2,000 to 3,000	19,500	8,000 to 9,000	1,800
3,000 to 4,000	21,000	9,000 to 10,000	220
4,000 to 5,000	15,000	10,000 to 11,000	100
5,000 to 6,000	14,500		

The northeastern third of the Territory consists of a plateau at a considerable elevation, 5,000 to 7,000 feet above the sea. In this region the water-courses have everywhere cut deep gorges, in some localities leaving but a skeleton of the plateau. Among these gorges are the Grand Cañon of the Colorado, 7,000 feet in greatest depth, and several hundred miles in length; the canons, thousands of feet deep, of the San Juan, Colorado Chiquito, Cataract creek, and others. The highest portions of this region—as, for instance, the Kaibab plateau—are well watered, and covered with forests; but the greater part of it is arid and desolate. In the northeastern corner of the Territory the Carrizo Mountains rise from it to 8,000 or 9,000 feet above

sea level, and are covered with forests and grasses; while the valley of the Rio de Chelle, at their western base, is, in its upper part, fertile and grassy. The country about the head of the Colorado Chiquito, too, is a fine grazing land; although water is not by any means abundant.

Near the western margin of this plateau, rises the group known as the San Francisco Mountains. This is an outburst of volcanic rock, consisting of a number of peaks, the highest one, which bears the same name as the group, being, as was stated above, 12,052 feet in height, and rising some 6,000 feet above its base. This group is heavily timbered, and the forests extend for some distance from the base on all sides; while towards the south and west the forest extends along the edge of the plateau, even into New Mexico. The edge of this plateau region is quite well defined. It extends from near the mouth of the Grand Wash southwestward nearly down to latitude 34°, where its general course turns to the west, and it runs out of the Territory, becoming less and less defined as the country at its base, about the heads of the Gila, becomes more elevated.

Descending from this plateau, we find, in the northwest, the low, desert country immediately succeeding it; but farther south, a broad belt of fertile country, broken by numerous small mountain ranges, and watered by abundant streams, separates the desert plateau from the desert lowlands. This is the garden region of Arizona. Its total breadth in the neighborhood of Prescott is fifty or sixty miles; and it extends southward and westward, with approximately that width, around into New Mexico. In this section the mountains are well timbered, the valleys covered with grasses and flowers, while the climate is superb.

The western and southern parts are, generally speaking, a desert. Wherever there is water, there is abundant vegetation; but there is water along a few lines of drainage only. Sparkling streams, coming down from the highlands on the north and east, and entering this region, become muddy and alkaline, and soon disappear, absorbed by the thirsty atmosphere and the still more thirsty soil. This section is traversed by numerous short, narrow mountain ranges, between which are valleys or dreary stretches of hot, desert plain. Few of them contain any water or vegetation, excepting stunted sage, and various species of cacti and mimosæ. This is the home of that strange plant known to botanists as Cereus Giganteus, the Giant Cactus.

Growing to a height of twenty to thirty feet, standing alone on the plain, with its naked arms outstretched, it is a striking spectacle.

Concerning this strange region, the geologist Marvine wrote,* "To stand upon the edge of the Pinal Mountains upon a quiet day, and look off upon those wonderfully silent and arid plains, with their innumerable 'Post mountains' rising like precipitous islands from the sea, all bathed in the most delicate tints, and lying deathlike in the peculiar, intangible afternoon haze of this region, which seems to magnify distant details rather than to subdue them, impresses one most deeply. The wonderful monotony seems unenclosable by an horizon; and one imagines the scene to continue on and have no end. Though the gulf and ocean are three hundred miles away, yet here is the Continent's real southwestern border."

The general condemnation of this section is not universal. The valley of the Lower Gila is susceptible of cultivation to a considerable extent, depending, of course, upon the amount of water which the stream can supply. About Tucson, too, is a small extent of irrigable land; and in other sections there are small areas which can be irrigated and rendered fertile. Altogether, however, these cases form but a very small proportional part of the total area of this region.

The climate of the Territory is arid in the extreme, especially in the lowland section. In the middle country, as the vegetation indicates, the aridity is not as great; but nowhere is the rainfall sufficient for the needs of agriculture. The following table, taken from Powell's "Arid Lands," illustrates the annual rainfall of the Territory:

Stations.	Rainfall, inches.	Stations.	Rainfall, inches.
Camp Bowie, Ariz.	15.26	Fort Bayard, N. M.	14.83
Camp Grant, Ariz.	15.68	Fort Defiance, Ariz.	14.21
Camp McDowell, Ariz.	11.45	Fort Yuma, Cal.	3.91
Camp Verde, Ariz.	10.89	Camp Mojave, Ariz.	4.59
Camp Whipple, Ariz.	19.28		

The last two stations are in the low country along the Colorado river. The net result of the above table is to show that the rainfall in the low country is four or five inches annually; that in the middle country, at the base of the Colorado plateau, ranges from fifteen to twenty inches; while on the plateau it ranges from ten to fifteen inches.

* Report Geographical Surveys West of the One Hundredth Meridian, Vol. II.

The temperature, too, has a wide range, with the elevation. The hottest part of the United States is at Yuma, on the Colorado.

The following table, taken from the Smithsonian Temperature Tables, shows the range of temperature in the Territory in degrees Fahrenheit:

Stations.	Mean Annual Temp.	Max'm Temp.	Min'm Temp.	Stations.	Mean Annual Temp.	Max'm Temp.	Min'm Temp.
Camp Bowie	64	105	0	Camp Verde	68	113	5
Camp Colorado	73	108	30	Camp Wallen	63	103	8
Camp Crittenden	61	105	17	Camp Willow Grove	55	.....	.....
Camp Date Creek	63	111	16	Fort Defiance	49	.....	.....
Camp Goodwin	66	111	10	Fort Mojave	73	118	14
Camp Grant	68	116	16	Fort Whipple	54	110	—10
Camp Lowell	69	112	20	Fort Buchanan	60	108	12
Camp McDowell	71	114	16	Fort Canby	.....	99	—35
Camp Reno	70	.....	.....	Fort Yuma, Cal	75	117	15

In the northern and central parts, there is seldom any snow, except upon the mountains, and frosts are rare. There is, however, a great range of temperature between day and night, summer and winter.

The fauna of the Territory is very poor, and is characteristic of an arid climate. Coyotes, rattlesnakes, scorpions, and centipedes, with several species of lizards, epitomize and characterize the animal life of the low country and of the arid plateaux. In the broken country about the base and on the slopes of the Colorado plateau, large game, such as bears, deer, and antelope, are found, but not in abundance.

The surface geology of Arizona is quite complex, and is characterized by the great extent which is covered by the Eozoic formation. The northeastern part, being a portion of the Colorado plateau, is covered with Cretaceous beds. This is one of the most desert portions of the Territory, and, being gashed by innumerable cañons, is almost impassable. It is in this almost inaccessible portion of the Colorado plateau that the Moquis villages are situated. Southwest of this area is a strip of Eozoic, marking the valley of the Colorado Chiquito, followed by a broad belt of Silurian, which extends to the margin of the plateau, and, on the north, extends across the cañon of the Colorado, into Utah. In the midst of this area rises the volcanic group of the San Francisco Mountains, which, until a comparatively recent geologic date, have been belching

lava and ashes over the surrounding country. The Silurian is succeeded southward and westward by a large area of Eozoic, which occupies the slopes of the plateau and the country about the head of the Gila. The low country is covered by Tertiary and alluvium; but the Eozoic re-appears on the mountain ranges, accompanied, in some cases, by the Silurian.

The agricultural interests of the Territory can never be great, owing to the small amount of water which can be utilized for irrigation. The Colorado river, which is by far the largest stream, and is navigable to the foot of the Black Cañon, can not be used to serve any large quantity of land, owing to its bluff, high banks and canon walls, and its slight fall where it flows through the open country. The Gila can be used entirely; but, though its drainage basin is extensive, it is not a large stream. Williams Fork of the Colorado and the Colorado Chiquito can be entirely used; but they are still smaller streams. I have estimated that possibly five per cent. of the Territory can be put under irrigation by making the best and fullest possible use of the streams. Of this the principal part is in the valley of the Gila, and its branches from the north. The streams from the south are all small and of little importance. The arable area, under this estimate, amounts to 5,650 square miles, or about three and a half millions of acres.

The cereal products of this Territory, according to the Census tables of 1870 and 1880, amounted to 410,788 bushels in 1879, as against 114,195 in 1869, divided as follows:

Crops.	1870.	1880.
Wheat	27,053	136,497
Rye		
Oats	25	564
Indian corn	33,041	84,746
Buckwheat		
Barley	53,077	239,051
Totals	114,195	410,788

In respect to grazing, the Territory makes a better showing. A large proportional part of the Territory is covered with grasses; and the climate is so mild that sheep, as well as cattle, need no provision against inclemencies of weather. Since the settlement of Indian troubles, stock has been moving rapidly

into the Territory from New Mexico. The Census of 1880 makes the following return of live stock:

Cattle	145,000	Sheep	1,826,000	Swine	9,700

The mineral resources of Arizona are comparatively almost untouched. True, in the southern part, mines of gold and silver, of great value, were worked by the Spaniards, centuries ago; and, in other parts, mines of great richness have been opened; but their development has been prevented, until very recently, by the omnipresent Apache. That pest having been suppressed, mining has sprung anew into being, the old mines are resuming work, and new ones are being opened all over the Territory. To go into details regarding mining discoveries would be an endless undertaking, as they are scattered far and wide over the Territory. The production of precious metals is as yet, however, very limited, in comparison with what we may confidently expect in the near future. In 1879, the total production, according to Wells, Fargo & Co., was $1,942,403; nearly all of which was silver. In 1880, it had increased to $4,472,471; of which nine-tenths was silver. In 1881, we may expect a still more rapid increase as the new discoveries are brought into paying condition.

The Southern Pacific is the only railroad in the Territory. This crosses it from west to east, near its southern boundary; and the great progress of the Territory during the past two years is due very largely to this line of road. A branch is projected from some point on the Gila to Prescott, the capital; and the Atlantic & Pacific has located its route across the northern part.

The population of the Territory in 1880 was 40,441, against 9,658 in 1870, an increase of 319 per cent. in ten years.

The population by counties is as follows:

Apache	5,283	Pinal	3,044
Maricopa	5,689	Yavapai	5,015
Mojave	1,190	Yuma	3,215
Pima	17,007		

In 1880 the Territory contained no National banks, and but five private banks, with a capital of but $112,930.

The following statement of the wealth and debt of the Territory is from the returns of the Tenth Census:

Real estate (assessed valuation)	$2,513,985
Personal property (assessed valuation)	2,849,918
Total assessed valuation	5,363,903

The above is estimated to be about sixty-six per cent. of the true valuation, which is, approximately, $8,043,000. The county debt is $277,136.

There are within the Territory no less than 20,800 Indians, of the various tribes known as Apache, Yuma, Mojave, Chimehueva, Hualapai, Coahuila, Cocopa, Pima, Maricopa, Papago, and Moqui. Excepting the Apaches, these Indians are mild, inoffensive, and tractable. Most of them have long been under the spiritual dominion of Jesuit padres, whose influence has been everywhere for good. They are living in settled communities, and are mainly self supporting. The Moquis, who resemble the Pueblo Indians of New Mexico in many respects, dwell in towns built of stone, situated, for safety, upon the summits of almost inaccessible mésas. They live a pastoral life, having large herds of sheep and goats, and raising grain, vegetables, and fruit for their own consumption.

In many parts of Arizona, and, indeed, over portions of the neighboring State of Colorado, and Territories of New Mexico and Utah, are found abundant signs of a former dense civilization, a civilization far in advance of that of the Indians proper now inhabiting those regions, and resembling in many essential features that of the Moquis and Pueblos. The resemblance is so striking as to lead to the irresistible conclusion that the latter peoples are but the remnant of a large and powerful race that once covered with a dense population this great region. This conclusion is strengthened as we read their history as mapped out for us by these ruins. We find, first, large towns, located without regard to defensibility, in the bottom lands of streams, or on the bluffs, surrounded by arable and pasture lands, where they raised their corn and fed their herds. Then we find them looking for defensible positions, and building castles and watch towers in their settlements, which are placed upon mésas, difficult of access. The last resource of a desperate and hunted people is seen in their "cave dwellings," where they have taken refuge in the crannies of the cliffs, which they walled up, and to which access could be had only by ladders or by niches cut in the rock. The Navajoes, Apaches, and Utes obtained this country by conquest from this people, and can show no other title.

CHAPTER XXII.

TERRITORY OF WASHINGTON.

WASHINGTON Territory, from its vast extent of arable lands, its mild and equable climate, its abundant rainfall, as well as its immense forests of valuable timber and its salmon fisheries, is destined to become one of the most populous and productive of our Western States.

It is the most northwestern of the States and Territories. It borders on British Columbia on the north; while the Pacific ocean washes its shores on the west. On the south, it is separated from Oregon by the Columbia river, and the parallel of 46°, and on the east from Idaho by a broken line, nearly on the meridian of 117°. The first settlements in what is now Washington Territory were made by the fur traders. Several posts established by John Jacob Astor were seized by the Hudson's Bay Company about the time that Astoria was taken possession of by them. The claim of the United States to this region was based upon a liberal construction of the terms of the Louisiana purchase, and also upon the fact that one Captain Gray, in command of an American vessel, as was claimed, had priority of discovery of the coast. There was a long controversy about its possession, which at last was settled in favor of the present owners. In 1853, the Territory was organized, at that time including much of what is now Idaho.

Until within a recent period, the population has been very small, and has been almost entirely confined to the coast and the valley of the Walla Walla river. The Territory is remote, and has been difficult of access. Within two or three years, however, a strong tide of immigration has set thitherwards, attracted by its immense wheat fields, pasture lands, and forest resources. The completion of railroads connecting it with the rest of the world, which can not be long delayed, will add very materially to the influx of population.

The area of the Territory is known only approximately, but

may be set at 69,180 square miles. Its mean height above sea level is 2,600 feet. The distribution of its surface in elevation is as follows:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
From sea level to 1,000	16,300	7,000 to 8,000	1,100
1,000 to 2,000	18,300	8,000 to 9,000	800
2,000 to 3,000	15,000	9,000 to 10,000	700
3,000 to 4,000	6,900	10,000 to 11,000	500
4,000 to 5,000	4,400	11,000 to 12,000	320
5,000 to 6,000	3,200	12,000 to 13,000	100
6,000 to 7,000	2,600		

The habitable, or rather the cultivable, area, is nearly all below the curve of 3,000 feet above the sea. The higher country is mountainous, and is of value only for its natural wealth of forests and minerals.

The Territory consists of two distinct parts, separated by the Cascade Range, which differ greatly in character of surface, vegetation, and climate. This range traverses the Territory from north to south, its crest cutting off the western third of the Territory. It is a high volcanic plateau, very much broken, and with a series of volcanic peaks rising far above its general level. Many of these show signs of very recent volcanic energy, the rock near their summits being hot, while smoke and steam are still escaping from crevices; and more than one has been said to have been in eruption since white men entered the country. The highest peak in the range and in the Territory is Mount Rainier, which towers to a height of 14,444 feet above the sea. Then follow Mount Adams, 9,570 feet; Baker, 10,719; Hood, 11,225; and St. Helens, 9,750. The whole range is covered with dense forests of coniferæ, which constitute a large source of supply of valuable lumber.

West of this range lies a broad valley, trending parallel to the coast and the Cascade Range, *i. e.*, very nearly north and south; while between it and the coast are several masses or groups of mountains, which together form a more or less continuous range. Both valley and mountains are covered with forests of valuable timber, the export of which is already a branch of industry of great importance.

The valley lying between the Cascade and the Coast Mountains is the most thickly settled part of the Territory, and probably the finest agricultural region.

The climate of the western part of the Territory is very moist, so much so that it has become proverbial, and the inhabitants

are known as "Webfeet." The annual rainfall ranges from 70 to 125 inches, being greatest at the northwestern corner, on the coast of Puget Sound. The temperature is very equable, the range of monthly means of temperature from summer to winter being but 27°, while the mean annual temperature is about 51°.

East of the Cascades, one enters a region radically different. A narrow strip on the north is mountainous and forest-covered. South of this lies the Great Plain of the Columbia, which is comparatively arid, and covered with grass, while in the drier parts there is considerable sage. This region appears to resemble very much the plains of Western Kansas.

The rainfall is very much less than west of the Cascades; although it is claimed by residents to be sufficient for cereal crops. It may, however, be doubted whether irrigation can safely be dispensed with. The western part of this open country, at the base of the Cascades, is undoubtedly well watered. The eastern part, too, at the base of the Cœur d'Aléne Mountains of Idaho, is better watered than the interior of the plains; and here irrigation may not be necessary.

The mean annual temperature of this part is about 45° being much lower than that of the western section; while the contrast between the summer and winter temperatures is much more decided. In the southeastern corner, the Blue Mountains of Oregon project a short distance into this Territory. They consist of a series of ranges, trending nearly northeast and southwest, and separating the warm and sheltered valley of the Columbia from the arid and inhospitable plains of the Great Basin.

The Territory is drained entirely into the Pacific ocean. Its principal river is the Columbia, which enters it from British Columbia, near its northeastern corner. Within the Territory it is joined by two large branches, Clarke's Fork, which heads in Montana, and the Snake river, or, as it was called originally, Lewis Fork, from Southern Idaho. Below the mouth of the latter stream, the Columbia forms the boundary between Oregon and Washington. With the exception of two series of rapids, known as the "Cascades" and the "Dalles," this river is navigable up to and beyond the mouth of the Snake. The influence of the tides is felt as far up as the foot of the Cascades, where the river has cut its way through the Cascade Range, a point 140 miles above its mouth. At its mouth is a bar covered with twenty feet of water at low tide.

The Pacific coast is comparatively simple, containing few bays or inlets. Of these, Gray's Harbor and Shoalwater Bay are the largest. The shore of the Strait of Juan de Fuca is also simple, with high bluffs and mountains rising from the water. Farther eastward, however, at the head of the strait, there is a complicated system of sounds and islands extending southward up the valley which lies between the Cascade and Coast Ranges, offering many fine harbors, and easy water communication.

The fauna does not differ materially from that of the neighboring Territories. Among the large mammals, are black and grizzly bears, moose, elk, two species of deer, the Rocky Mountain goat, antelope, etc. Among fishes, the salmon is by far the most abundant, and, besides serving as the staple diet for the aboriginal population, is now becoming a very important article of export. In 1878, 160,000 cases of salmon, each containing forty-eight cans, were exported from the Columbia river alone.

The lumber resources of the Territory are almost inexhaustible. Fully two-thirds of it are covered with forests. They comprise various species of pine and fir, the Oregon cedar, besides maple, ash, laurel, and alder. The coniferæ are of a great size and height, ranging from eight to fifteen feet in diameter, and from 175 to 350 feet in height. The business of cutting and exporting lumber to various points on the Pacific coast, particularly to San Francisco, is a great and growing industry. The amount cut annually is estimated at 250,000,000 to 300,000,000 feet, of which 150,000,000 feet are exported.

Of the area of Washington, probably twenty-five per cent. will eventually be utilized for agriculture. The greater part of this is in the region of ample rainfall, where irrigation is not needed. The climate is sufficiently mild for raising all cereals and all the hardier garden vegetables. At present, agriculture is carried on mainly in the great valley between the Cascade and the Coast Ranges, and in the valley of the Walla Walla and the Snake. The progress of settlement now is mainly northward from the Snake river, in the eastern part of the plains of the Columbia. In 1878, the exportation of wheat was more than 60,000 tons.

The Census Bureau's statement of the cereal products of Washington Territory in 1859, 1869, and 1879, is as follows:

Crops.	1860.	1870.	1880.
Wheat	86,219	217,048	1,091,329
Rye	144	4,253	7,134
Oats	134,334	255,169	1,071,700
Indian corn	4,713	21,791	89,188
Buckwheat	707	316	3,495
Barley	4,621	55,787	666,597
Totals	230,737	554,549	4,106,370

The grazing interest is a large and a rapidly growing one. The grazing region lies east of the Cascade Range, on the Great Plains of the Columbia and the strip of country lying south of Snake river. The grasses are mainly bunch grasses, such as are found on the plains east of the Rocky Mountains. The number of cattle now held in the Territory, according to the last Census, is estimated at 250,000; of sheep, 200,000; and of swine, 68,400.

The mineral resources are as yet but very slightly developed. Silver mines have been discovered at two or three points in the Cascade Range; but these discoveries are recent, and little development has as yet been made. The total product of the Territory for the year 1879 was but $85,336. In 1880, it had increased slightly, being given as $105,164.

Coal is mined at several points. An excellent quality has been found at Bellingham Bay, and near Seattle. This is a bituminous coal, and is from the Coal Measures. Farther south, in the Coast Range, it has been found in the Tertiary formation. Late researches have shown that about 20,000 square miles are underlaid by coal-bearing strata. The total coal production in 1879 was 170,000 tons.

In 1880, there were in operation within the Territory 274 miles of railroad. Of this, all but fifty-four miles are of the medium gauge; the narrow gauge craze having spent itself in great measure before railroad building had been carried to any considerable extent here. The principal road is the Northern Pacific, which had 137 miles in operation. The other roads, four in number, are short, and of local importance only.

The difficulty of communication between different parts of the Territory, and especially between the sections lying east and west of the Cascade Range, is very great. It is said that there is but one pass in the Cascade Range which is at all practicable for pack animals; and that is closed by snow for nine months of the

year. All mail and merchandise from Seattle for the northeastern parts of Washington must make the circuit of the Cascade Range, a long and tedious detour. Indeed, Seattle is said to be much nearer the States in point of time than it is to Fort Colville.

The total population of Washington Territory in 1880 was 75,120, against 23,955 in 1870. This population is classified as follows:

Male	45,977	Foreign	15,861
Female	29,143	White	67,349
Native	59,259	Colored	7,771

The population by counties is as follows:

Chehalis	921	Pierce	3,919
Clallam	698	San Juan	948
Clarke	5,490	Skamania	809
Columbia	7,109	Snohomish	1,397
Cowlitz	2,062	Spokane	4,263
Island	1,057	Stevens	1,245
Jefferson	1,713	Thurston	3,270
King	5,910	Wahkiakum	1,600
Kitsap	1,738	Walla Walla	8,716
Klickitat	4,097	Whatcom	3,127
Lewis	2,600	Whitman	7,014
Mason	699	Yakima	2,811
Pacific	1,645		

The following statistics of wealth and taxation are taken from the returns of the Tenth Census, and relate to 1880:

Total valuation (assessed)	$24,910,763
Territorial tax (for general purposes)	71,797
County tax for general purposes	260,719
County tax for school purposes	112,003

There is no Territorial tax assessed for schools.

It is estimated, from county returns, that the assessed valuation is fifty per cent. of the true valuation. The latter is, then, approximately $50,000,000.

In 1880, there was but one National bank in the Territory, and four private bankers.

According to the report on Indian affairs for 1879, there were within the Territory 13,268 Indians under the charge of the government. The total number is somewhat greater; as some have left the tribal organizations and the reservations. These Indians are of a large number of tribes, the principal ones represented being the Coeur d'Aléne and Spokanes. Those under governmental control are congregated upon seven reservations. The Spokane, or Colville, reservation is in the

northeastern part of the Territory, and comprises 2,800,000 acres. The Yakima reservation, comprising 800,000 acres, lies at the east base of the Cascade Range: all the others lie west of this range, on the coast or Puget Sound, and are small in extent. The Indians of the Territory are mainly of a low grade, physically and mentally. They are peaceably disposed, and are making decided advances toward civilization.

CHAPTER XXIII.

STATE OF NEVADA.

NEVADA is pre-eminently the mining State of the Union. California may have produced a greater amount of the precious metals; but it has other interests of a degree of importance fully equal to that of mining, while Nevada has not. Were the mines of this State to become exhausted, there would be little left to tempt mankind into its arid expanse.

Nevada has for its northern boundary, the parallel of 42° of latitude, bordering upon Oregon and Idaho. On the east lies the great alkaline plain of the Salt Lake Desert of Utah; the eastern boundary being the meridian of 37°, and, for a short distance in the southern part, the Colorado river. On the south, the State runs down to a point, whence the boundary line separating it from California runs northwest to its intersection with the 120th meridian west of Greenwich, which it follows thence to the 42d parallel. The history of Nevada is a history of its mines: the Comstock lode made the State.

Nevada is a part of the first Mexican cession, under the treaty of Guadalupe Hidalgo. At first a portion of California Territory, it was subsequently ceded to Utah, and, in 1861, was set off by itself as a Territory. In 1864, it was admitted into the Union as a State.

The area of the State is approximately 110,700 square miles. Its mean height above the sea is estimated at 5,600 feet. It lies almost entirely in the Great Basin; only the southern point, which is drained by the Colorado and Virgen rivers, having an outlet to the sea.

Its surface is made up of a succession of arid valleys, of greater or less width, but generally narrow, limited by narrow, abrupt ranges of mountains, trending nearly north and south. Most of the ranges are dry and waterless, excepting perhaps in the early spring, when, for a few days, their gorges may be enlivened by the sound of little trickling streams. The valleys

are still more arid. Most of them contain no water whatever; but their surface is either covered with a stunted growth of sage, or is a white, glistening field of alkali. These characteristics of mountain and valley are most general in the southern part of the State; while in the northern part there are several notable exceptions. North of the Central Pacific Railroad, which traverses the State in a southwest direction, there are several fine valleys, containing small perennial streams, while some of the ranges are covered with grasses, and others contain much valuable timber. In the eastern part, south of the railroad, is a portion of the Great Salt Lake Desert, a plain covered to a depth of several inches with alkali, and marking the former extension of the Great Salt Lake, at a time when the climate of the region was less arid than at present.

The principal river of the State is the Humboldt, which gathers its scanty waters from the ranges in the northeastern part of the State, and flows nearly across it, in a general southwestern course. Though a long stream, its body of water is comparatively small. It finally loses itself in a group of stagnant lakes and swamps in the western part of the State.

Along the western border the country rises into the Sierra Nevada; and in this narrow belt, its aspect changes entirely. Dense coniferous forests, high mountain meadows, and rushing mountain torrents please the eye and ear; but, looking down the mountain side toward the arid plains, we see the meadows and forests give place to the everlasting sage and alkali, while the clear mountain streams grow muddy and impure, dwindle, and finally disappear, absorbed by the thirsty atmosphere and the still more thirsty soil.

The valleys of the eastern and northeastern part of the State have a general elevation of 6,000 to 6,500 feet. Their level decreases westward and southward. At the base of the Sierra Nevada, they are not above 4,000 feet; while the sink of the Humboldt is slightly below those figures. The descent southward is more rapid, the country reaching an elevation of but 1,000 feet in the southern point of the State.

There is great variety in the height of the numerous mountain ranges, from 4,000 to 12,000 feet. Generally speaking, the highest ranges crown the most elevated valleys, and vice versa. The principal ones are the Humboldt, the Toyabe, Pah-ute, Diamond, Egan, and Gosi-ute ranges. The following table

shows the disposition of the country in regard to elevation above the sea:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
1,000 to 2,000	500	6,000 to 7,000	24,000
2,000 to 3,000	4,700	7,000 to 8,000	13,000
3,000 to 4,000	9,300	8,000 to 9,000	2,800
4,000 to 5,000	20,600	9,000 to 10,000	600
5,000 to 6,000	34,500	10,000 to 11,000	100

The climate is everywhere extremely arid; but there are grades and degrees of this extreme aridity. In the southern part the atmosphere and soil are much drier than elsewhere; and consequently the amount of running water is much less than in the northern part, toward the boundary of Oregon and Idaho. The rainfall ranges from five inches per annum to fifteen inches, in different parts of the State; while the average is not far from eight inches.

The temperature is subject to extreme variations with the seasons and with the alternation of day and night. In the southern part, the mean annual temperature is very high, averaging 65° to 70°, while maximum readings of 110° to 115° are not unusual. In the northern part, with the increase in latitude and elevation, the temperature decreases very much. The statistics from the following stations show the temperature in the middle and northern parts, in degrees Fahrenheit:

Stations.	Mean Annual Temperature.	Maximum Temperature	Minimum Temperature.
Camp Halleck	47	111	—23
Camp McDermit	49	104	— 9
Camp McGarry	43	90	—18
Camp Winfield Scott	51	99	—15
Fort Churchill	54	100	— 9
Fort Ruby	50	100	—23

The amount of arable land is very limited, being, as it is estimated, but three per cent., at the utmost, of the area of the State. This small proportion is due solely to the small supply of water for irrigation, and not to any scarcity of fertile soil; for the latter comprises an area many times as great as can be irrigated. There are hundreds of fine valleys, with fertile soil, but which contain not a drop of water from one year's end to another, and are doomed to eternal sterility.

In the southern part the Virgen and its branches can irrigate a limited area. Besides this, there is little irrigable

land in this portion of the State. In the northern part the Humboldt and its branches can irrigate narrow belts along their courses; while at the western base of the Sierra Nevada, there are small areas of irrigable lands. In view of the small area of arable land, Nevada is not destined ever to play an important part in the grain production of the country.

The cereal products of the State, according to the statistics of the Census Bureau, aggregated 782,519 bushels in 1879, as against 591,189 bushels in 1869, and but 6,868 in 1859:

Crops.	1860.	1870.	1880.
Wheat	3,651	228,686	60,200
Rye	98	310	.....
Oats	1,022	55,916	196,860
Indian corn	460	9,660	13,891
Buckwheat	.....	985	.....
Barley	1,597	295,459	513,470
Totals	6,868	591,189	782,519

The outlook for meat production, though better, is by no means favorable. However, there are, in the northern part of the State, especially in the mountains, considerable areas of fine grass land; while, in some of the sage-covered valleys, there is sufficient grass to afford subsistence to cattle. The Census of 1880 showed that there were in the State 283,900 cattle, 278,000 sheep, and 20,500 swine.

The fauna of the State is poor and sparse. There is practically no large game. Wolves, prairie dogs, and rattlesnakes typify the animal life. The vegetation is almost as poor. In the southern part, the only trees are the stunted pinon pines and cedars which are peculiar to an arid region, and which here are found only on the mountains. Farther north, many of the higher ranges contain pine and spruce timber in sufficient quantities for the present needs of the country. The flora of the valleys of the middle and southern parts consists of sage. Sage brush is everywhere: it is omnipresent. The very air is redolent with its perfume. In the most fertile valleys (the word is used qualifiedly), there is a little grass intermingled with the desert staple; but in most cases, the growth is so sparse that cattle would starve to death in searching for it. In the northern part of the State, and especially towards the

northeastern corner, there is, in many of the valleys, fine grazing land, the grasses being of the various species known collectively as bunch grass.

The surface geology of the State is very complicated and detailed, as may be supposed from the variety of its surface. In general, it may be said that the valleys and plains are covered with Quaternary drift or Tertiary beds; while the ranges are made up of older formations, in many cases the Azoic coming to the surface, with the Silurian, Devonian, and Carboniferous outcropping on their flanks. The details of the structural and stratigraphic geology of these numerous ranges are too complicated to admit of any detail in this work. In many localities, there are evidences of recent volcanic action, in the form of outbursts of volcanic rocks, forming mountain groups and ranges, or flooding the country with basalt, as in the northwestern portion.

It is to mineral resources that Nevada owes its present prosperity and its hopes for the future. Its product of the precious metals in 1879 was nearly $22,000,000, being greater than any other of the States and Territories. In 1880, it was much less, being reported by Wells, Fargo & Co. as $15,031,621, a decrease of about seven millions. In 1874, it was much larger, having been $35,400,000. The fluctuations in its product from year to year have been very great. Of its product, the larger proportion has been silver. The mines are almost entirely vein deposits of various kinds. Placers have been worked to some extent; but their product has never formed a material part of the production. The vein deposits take all forms, true fissure veins, contact deposits, segregations, etc.

The celebrated Comstock lode, from its great breadth, the enormous amount of the precious metals which have been extracted from it, and the depth and extent of the workings upon it is unquestionably the first of all. It was discovered in the early part of 1858, to a certain extent by accident; and it was more than a year thereafter, and after passing through the hands of two owners, that its true character and extent became known. The original discoverer is said to have sold his claim for a few drinks of whisky and a bob-tailed pony; while the purchaser in turn sold it for $5,000 or $6,000. The name was derived from that of this second owner.

It is probably a true fissure vein. Its width at the surface

ranges from 250 to 1,100 feet, but decreases downwards. Below the surface, there are places where it is not more than twenty feet in width. This great mass of rock is by no means all metalliferous: indeed, most of it is barren, or consists of a very low grade of ore. The rich ore is contained in seams, bunches, pockets, or *horses* (bonanzas), scattered through the vein matter. The ores are in great variety, consisting principally of native gold and silver, argentiferous galena, vitreous silver, and stephanite, besides a number of rarer combinations. The principal source of the metalliferous product has been from the bonanzas, or *horses*. These are great lenticular masses, several hundreds of feet in length and breadth, and of thicknesses ranging from 2 to 250 feet. Ten of these have thus far been discovered, with dimensions as follows:

	Length, feet.	Breadth, feet.	Thickness, feet.
Mexican and Ophir	600	650	2 to 70
Gould and Curry	600	540	3 to 100
Savage	500	300	5 to 60
Hall and Norcross	590	600	3 to 40
Chollar-Potosi	580	500	5 to 80
Gold Hill	1,040	550	10 to 100
Yellow Jacket	340	500	5 to 60
Kentuck	300	400	2 to 40
Crown Point and Belcher	600	600	5 to 60
Consolidated Virginia and California	700	600	20 to 250

The average yield per ton of the ore from the last, known as the "Big Bonanza," has been about $110.

The annual yield of the Comstock lode, from the time of its discovery up to and including 1876, is as follows:

1860	$ 100,000	1867	$13,788,618	1873	$20,216,063
1861	2,000,000	1868	8,479,769	1874	23,051,490
1862	6,000,000	1869	7,405,078	1875	24,995,617
1863	12,400,000	1870	8,234,272	1876	27,000,000
1864	16,000,000	1871	10,644,704		
1865	16,000,000	1872	18,159,009	Total	$234,074,309
1866	11,739,100				

The total amount disbursed in dividends by the two companies within whose ground was the Big Bonanza, up to the end of 1880, was $74,170,000, of which the California Co. disbursed $31,510,000; and the Consolidated Virginia, $42,660,000. The current value of the former mine, as indicated by the price of the stock, is at present about $1,000,000; of the latter about $1,500,000.

The proportional value of gold contained in the ore ranges from thirty-three to seventy per cent. In the Big Bonanza, it is forty-two per cent.

At present all the bonanzas thus far discovered have been worked out; and the work being done is in the direction of explorations for others that may exist at greater depths. The only sources of income to the miners while prosecuting their search is from assessments upon the unfortunate stockholders, and from working the lean ores from the vein mass. Meanwhile the difficulties and expense of mining increase rapidly as the depth increases, owing to the expense of hoisting, the presence of large quantities of water in some of the mines, and, most of all, the intense heat which has been encountered, which is out of all proportion to the depths attained. The temperature at the bottom of the deepest workings is 120° to 130° Fahrenheit, a degree which almost prevents men from working at all. Fresh shifts have to be put on every fifteen minutes, or the men would be overcome by the heat. It is an open question whether the days of the Comstock as a source of the precious metals are not over. At present none of the mines are paying dividends, and most of them are a source of heavy expense to the unfortunate holders of stocks. The latter are the footballs of the stock exchanges, where they are manipulated for the benefit of the insiders, and to the injury of the "lambs."

Besides the Comstock, there are a number of productive mining districts in Nevada. The Eureka is one of the best known and most productive. The deposits are segregations; and yet, on this most uncertain form of deposit, the Eureka Consolidated Company has paid in succession no less than sixty-one dividends, aggregating four and a half millions of dollars.

The White Pine district, also, was enormously rich, but short lived, as its deposits were limited, and were rapidly worked out. At present there are a few claims being worked there.

The Tuscarora district, which has produced a large amount, is dependent upon segregated deposits; and consequently the fortunes of the district fluctuate with the luck in striking "pockets."

The manufactures of the State are limited, and are confined mainly to those relating more or less directly to mining. In 1874, there were 143 quartz crushing mills, which crushed annually

over 600,000 tons of ore; there were fourteen grist-mills and twenty-seven saw-mills, besides such minor manufactures as were required by the population.

In 1879, there were in operation in the State six railroads, working, altogether, 700 miles of track. Of this, 220 miles was narrow gauge (three feet), the remainder being the ordinary gauge. Of these roads, the principal are, the Central Pacific, of which, 447 miles are within the State; the Eureka and Palisade, 97 miles; the Nevada Central, 93; and the Virginia & Truckee, 54 miles.

In 1880, the State contained but one National bank in operation. There were, besides this, four State banks and nine private bankers.

The population of the State, as returned by the Census of 1880, was 63,483. It contains fifteen counties, whose population was as follows:

Churchill	479	Lyon	2,493
Douglas	1,581	Nye	1,972
Elko	5,717	Ormsby	5,410
Esmeralda	3,230	Roop	788
Eureka	7,066	Storey	14,115
Humboldt	3,490	Washoe	5,794
Lander	3,634	White Pine	9,084
Lincoln	2,687		

The principal city is Virginia City, which is built on the slope of Mount Davidson, immediately over a portion of the Comstock lode. Its population in 1860, 1870, and 1880, is shown below, together with the principal statistics regarding its financial condition:

City.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Total Assessed Value of Real Estate and Personal Property.	Estimated True Value of Real Estate.	Total Assessed Value of Personal Property.	Taxation. Tax Levy.	Total Debt.
Virginia City	2,345	7,048	10,705	$4,180,450	$3,000,000	$7,000,000	$170,000	$110,000

The Indians found within the State are mainly those known as the Pah-utes, or Diggers. They and a band of Shoshones are supposed to be located on a reservation in the western part, about the Pyramid Lakes; but they range over much of the surrounding country. They are, physically and intellectually, much below the average of the American tribes. While not warlike, they are tricky and thievish. The Shoshones

inhabit a reservation on the northern border. They are of a much higher grade in all respects.

The following statistics regarding the wealth, debt, and taxation of the State, are from the reports of the Tenth Census, and are therefore the latest authentic information upon the subject:

Total assessed valuation	$39,291,460
True valuation, probably three times assessed valuation	67,674,380
County debt, bonded	804,641
County debt, floating	223,845
State tax for general purposes	146,435
County tax for general purposes	496,519
State tax for school purposes	14,646
County tax for school purposes	102,531

To conclude: Nevada is nothing, if not a mining State, and, at present, its mining interests are not in a satisfactory condition. The Comstock lode is not paying expenses, and comparatively few of the other mines are doing any better. But I assume no risk in saying that its mineral resources are far from being exhausted. The prospector has by no means covered the field, and there are undoubtedly many rich leads, awaiting the lucky seeker for wealth. The history of a mining State, like that of the miner, is made up of vicissitudes—now rolling in wealth, and the next day penniless.

CHAPTER XXIV.

STATE OF OREGON.

THIS State, like California, presents us with the greatest diversity of surface, climate, and soil. It contains fertile and well-watered valleys and arid plains. The State is bounded on the north by the Columbia river and the parallel of 46° north latitude, its neighbor being Washington Territory; on the east the Snake, or Shoshone, river, and the meridian passing through the mouth of the Boisé river, form the boundary with Idaho; on the south the parallel of 42° separates it from Nevada and California; while the Pacific ocean is its western limit.

The coast of Oregon was discovered and mapped during the latter part of the sixteenth and the beginning of the seventeenth centuries, by the Spanish navigators; and, so far as priority of discovery gives a title to a country, the Spaniards could claim possession here. They, however, made no attempt to settle the country.

The claim of the United States to this region was based, not only upon discovery and explorations, but upon treaties made with Spain and France, and actual settlement. The Columbia river was discovered and explored by Capt. Robert Gray, an American, who gave the name of his ship to the river. This was early in the nineteenth century. In 1804–5, the Columbia river and the country adjacent were explored by Captains Lewis and Clarke during their celebrated expedition across the continent. It has also been claimed that the Louisiana purchase included the country west to the Pacific ocean, within which this State is comprised. Whether this is a valid claim or not, it is scarcely worth while to discuss it in this connection. The treaty concluded between Spain and the United States in 1819, by which all the territory north of 42° north latitude was expressly declared to belong to us, would be conclusive proof of our title, were it certain that Spain had the power to give title to this region.

Shortly after the beginning of the present century the Hudson's Bay Company began to extend its field of operations into this region; and it was then that the question of ownership began to be agitated. It was not settled until 1846, when the boundary between the two countries was set on the forty-ninth parallel.

Apart from the establishment of the American Fur Company's trading station at Astoria, in 1811, no settlers arrived from the United States until 1832. But immigration did not reach any considerable importance for ten years thereafter. In 1843, a provisional government was adopted by the settlers; and in 1849, a Territorial government was instituted by the Federal authorities. As at first constituted, the Territory of Oregon included what is now Washington Territory. In 1859 it was added to the Union as a State, with its limits as they stand at present.

The area of Oregon is approximately 96,030 square miles. Its mean height above the sea level is about 3,800 feet. The following table shows the area lying between the different lines of elevation:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
From the sea level to 1,000	11,100	7,000 to 8,000	2,800
1,000 to 2,000	11,400	8,000 to 9,000	1,500
2,000 to 3,000	10,900	9,000 to 10,000	800
3,000 to 4,000	11,100	10,000 to 11,000	330
4,000 to 5,000	10,300	11,000 to 12,000	200
5,000 to 6,000	11,300	12,000 to 13,000	100
6,000 to 7,000	4,900		

The State is divided into two parts, differing essentially in climate and productions, by the Cascade Range. The portion west of the range, constituting about one-third the area of the State, is well watered, fertile for the most part, covered with forests of valuable timber, and is capable of supporting a comparatively dense population. The eastern two-thirds of the State presents a sharp contrast to the latter; this section is mainly made up of arid plains, over which the rainfall is not sufficient for agriculture without the assistance of irrigation. There is no timber except upon the mountains; and even there, there are few localities where it is sufficiently large to be valuable as lumber. The principal growth upon the plains is the omnipresent sage brush. The valley of the Columbia river and of the Walla-walla is much less arid than that lying south of the Blue Mountains, and should be excepted from the general condemnation.

The Cascade Range, which, throughout Washington and Oregon, forms the eastern barrier of the moist air currents, has an average breadth, in the State, of between fifty and sixty miles. It is a broad mass of elevation, through which rise at intervals volcanic cones, either extinct or nearly so. The mass of the range averages, perhaps, 8,000 feet elevation; while certain peaks in it rise several thousands of feet higher—such as Mount Hood, with a height of 11,225 feet.

West of this range succeeds a broad and fine valley, the northern part of which is drained by the Willamette river, flowing northward into the Columbia, while the southern third is occupied by the Umpqua and Rogue rivers, which, cutting through the coast ranges, flow directly into the Pacific. This valley is mainly what is known as park country, being covered with bunch grass and groves of coniferæ. It is rapidly becoming one of the great wheat fields of the Northwest. Separating this valley from the coast is a series of broken ranges, which are the continuation northward of the coast ranges of California. These range in height up to 6,000 feet, but vary extremely in this respect in different parts. At several points they are connected with the Cascade Range by means of heavy transverse spurs, such as the Calapooya Mountains, which separate the head of the Willamette from the Umpqua river, and the Rogue River Mountains, which separate the latter stream from the Rogue river. The Siskiyou Mountains, on the California border, separate Rogue river from the Klamath. In the eastern part of the State the most marked topographical feature is the range known as the Blue Mountains, which, having a northeast and southwest trend, separates the valley of the Columbia from the plateaux of the Great Basin. These mountains rise to heights of from 8,000 to 9,000 feet above sea level, and are tolerably well clothed with timber. North of these is the great valley of the Columbia and Umatilla rivers, which is rapidly assuming prominence as a wheat growing region. The region of the Great Basin, lying south of the Blue Mountains and east of the Cascades, is, as was indicated above, a comparatively desert region. Its height above the sea ranges from 4,000 to 5,000 feet. It contains numerous lakes, which form sinks for their tributary streams. The southwestern part of this region is overlaid by basalt, making the formation popularly known as the Lava Beds, in which the Modocs so long

held the United States army at bay. The region along the southeastern border of the State, drained into Snake river by means of the Owyhee and its branches, is but little better than the average of the Great Basin.

The navigable rivers of the State are as follows: The Columbia, which is navigable for 396 miles from its mouth. Its navigation is broken at two points—the Cascade and the Dalles—both of which occur in its passage through the Cascade Range; the Willamette, which is navigable during high water for 138 miles; and the Yamhill, for a short distance during high water.

As was stated above, there is a very marked difference in the climate of the two sections of the State. West of the Cascade Range, the climate is that of the sea coast, mild and equable, with slight ranges of temperature and an abundant rainfall. There are here well-marked wet and dry seasons. The Cascade Range acts as a barrier to the currents of moist air, forcing them to disgorge their stores of vapor upon their western slopes and summits, and to pursue their eastward course as dry winds. Hence the region east of the Cascade Range and south of the Blue Mountains has little rainfall, a dry atmosphere, and great extremes of temperature; while, in the country east of the Cascades and north of the Blue Mountains, to which the Cascade Range forms but a partial barrier, we find a climate which partakes of the characteristics of both sections. It might be called a semi-humid region, where the rainfall in some years is sufficient for the production of crops, and in others it is not.

The annual precipitation along the Pacific coast averages about sixty-seven inches, the greater part of which falls in the winter season. In the Willamette valley, it is somewhat less, being, on an average, about fifty inches; the valley of the Columbia, east of the Cascade Range, receives from eighteen to twenty-two inches, decreasing eastward; while the Great Basin, south of the Blue Mountains, receives only nine to fifteen inches of rain and snow during the year.

In the western section of the State, the mean annual temperature ranges from 50° to 55°; while the range between the means of the hottest and coldest months amounts to but 26°. In the western part, the mean annual temperature is from 45° to 50°, the range between the hottest and coldest month is 45°, while the range between the extremes of temperature is not less than 122°.

The arable land of the State is mainly in the sections west of the Cascade Range and north of the Blue Mountains. The largest body of arable land is the Willamette Valley, which has a length of 150 miles and a width of from fifty to sixty miles, with an area of 5,000,000 acres; the valley of the Umpqua, of nearly 2,500,000 acres, lying directly south of the latter, and forming really a continuation of it; and that of Rogue river, which also forms a part of the same great trough, between the Cascade and Coast Ranges. The latter valley has an area of 2,400,000 acres. There are also great bodies of arable land between the Blue Mountains and the Columbia river, including the well-known and fertile valley of the Umatilla. Upon the east side of the Blue Mountains are several small but fine valleys, the principal of which is known as the Grande Ronde valley, which contains about 275,000 acres. In the southeastern part of the State, the amount of arable land is comparatively limited, owing to the universal necessity for irrigation and the small amount of water available for that purpose.

The principal industry of the State is agriculture; and of this wheat is the principal production. It is noted for its weight, which frequently reaches sixty-five pounds to the bushel, and for the superiority of the flour made from it. Oats form, also, a very important crop; while large amounts of the other cereals are produced.

The following table, compiled from the statistics of the Census Bureau, shows the rapid increase of agricultural production in Oregon during the period from 1860 to 1880:

Crops.	Production 1860, bushels.	Production 1870, bushels.	Area acres, 1880.	Production 1880, bushels.	Product per acre 1880, bush.
Wheat	836,776	2,240,746	445,077	7,490,010	17
Rye	2,704	3,890	841	13,305	16
Oats	885,673	2,029,909	151,624	4,885,550	29
Indian corn	76,123	72,136	5,446	120,362	22
Buckwheat	2,749	1,645	973	6,215	17
Barley	26,254	310,736	29,811	930,977	32
Totals	1,830,278	4,659,054	632,871	13,988,019	.....

The average value of cleared farming land in 1880, was $21.71; of timbered land, $4.50. The average rates of wages paid to farm hands during the year 1880, were as follows:

Per month, without board	$27.49
Per month, with board	23.43
Transient, in harvest, without board, per day	2.15
Transient, in harvest, with board, per day	1.61
Transient, not in harvest, without board, per day	1.50
Transient, not in harvest, with board, per day	1.00

Cattle raising has long been an important industry of the State, second only to that of agriculture. The bunch grasses of the valleys of Oregon are noted as being among the most luxuriant and nutritious in the West.

The following figures from the rough returns of the recent Census (1880) show the importance of this industry: Cattle, 500,000; sheep, 1,250,000; swine, 250,000. In number of cattle, Oregon stands eighth in the list of Western States and Territories; and of sheep, fifth.

The population of Oregon in 1850 was 13,294; in 1860, it had increased to 52,465; in 1870, to 90,923; and in 1880 the Census gives it at 174,767. The following table shows the nineteen original counties in their order of increase and decrease in real and personal property since 1858:

Counties.	1858.	1877.	Increase.	Decrease.
Benton	$1,789,104	$1,728,987	.....	$60,117
Clackamas	1,947 180	1,861,029	.....	86,151
Clatsop	318,517	1,245,227	$1,026,710	.....
Columbia	190,844	308,097	117,253	.....
Coos	118,200	921,290	803,090	.....
Curry	81,364	278,953	197,589	.....
Douglas, including Umpqua	1,377,426	2,503,593	1,126,397	.....
Jackson	1,378,461	1,392,508	114,047	.....
Josephine	313,592	272,986	.....	40,866
Lane	2,246,418	2,980 513	690 095	.....
Linn	2,673,246	4,620,303	1,945,057	.....
Marion	2,300,000	4,198,400	1,898,400	.....
Multnomah	2,587.184	10,089,985	7,495,801	.....
Polk	2,217,066	1,506,183	.....	710,994
Tillamook	44,154	88,267	45,113	.....
Umpqua	503,329	.....	.....	503,329
Washington	1,019,806	2,020,550	1,001,244	.....
Wasco	472,130	1,544,489	1,072.359	.....
Yamhill	1,488,385	2,239,897	756,162	.....
Totals	$22,824,118	$40,505,907	$18,985,187	$1,403,397

The amount of taxes levied for the same year for State purposes, was $281,914. The total assessed value of property as returned to the Census office for 1880 was $70,010,699. Property in Oregon is assessed about sixty per cent. of its true value; and

hence the true value of property may be estimated at about $116,000,000.

The total county tax for the fourteen counties returned was $253,221, in 1880. There is no State tax for school purposes, the county school tax aggregating last year $133,478, and the school district tax, $79,562. The city of Portland, which had only 2,917 inhabitants in 1861, has to-day a population of 17,578, and is the only seat of commerce and the only distributing point on the North Pacific coast for a population of about 250,000 persons. The assessed valuation of property in Portland for 1880 is given at $13,143,425, the tax levy at $330,301, the rate being $2.65 on the $100. The bonded indebtedness of the city is $76,500, of which $56,500 was issued in 1871, and $20,000 in 1873; the first amount maturing in 1881, and the second in 1883. These bonds were issued principally for the purchase of a city park.

The estimated true value of real estate is $8,378,750, and that of real estate and personal property both is $25,136,250.

In the chapter on the large cities of the West, mention will be made of the commercial importance of Portland.

In 1872 there were only eighty-two miles of railroad in Oregon. Seven years later the State boasted 348 miles; but in 1880, many miles of much needed new railroad were constructed, and the State to-day has 582 miles. According to Bradstreet's Commercial Agency, there are over 1,300 *bona-fide* commercial houses in the State. The following table shows the number of business firms and manufactories quoted in these reports:

Business.	No. of Establishments.	Capital.	Real Estate.	Total Wealth.	Average.
Commercial Houses	1,814	$8,182,575	$6,610,950	$14,678,182	$11,171
Trades	478	170,225	251,650	423,875	890
Company & individual man'f's	329	1,361,600	1,803,100	3,166,450	9,624
Incorporated manufactures	3	158,000	90,000	301,500	97,167
Totals	2,115	$9,872,400	$8,754,700	$18,559,957	$ 8,775

Compared with the average wealth of commercial houses in most other States of nearly the same age, the average here is large; while the average wealth for each individual manufacturer or company is most hopefully significant of continued growth.

The extent of business done in this State may be judged from the following abstract of Oregon's exports for the year ending Aug. 1, 1880, compared with preceding years:

Products.	1879-80.	1878-'79.	1876-77.	1877-78.
Salmon exports to San Francisco, 1st August, 1879, to July 31, 1880, 211,569 cases: value	$1,570,610	$1,948,672	$1,750,380	$ 960,926
Wheat, flour, oats, hops, potatoes, lumber, hides, pickled salmon, treasure, and all other domestic products, except coal and wool, from Columbia river to San Francisco: value	2,909,473	2,989,888	2,333,000	3,705,697
Coals to San Francisco from Coos bay: value	283,705	150,355	317,475	218,410
Lumber & other prod'ts fr. Coos bay & Oregon coast		103,718	178,207	151,134
Wool exports via San Francisco, including Southern Oregon	2,155,147	1,567,208	756,000	998,305
Total via San Francisco	$9,021,998	$8,057,895	$5,339,119	$6,194,491
Wheat and flour exports direct to United Kingdom, 2,032,105 centals of wheat, 120,466 bbls. of flour, together 127,179 tons of wheat: value	4,766,677	3,765,000	3,552,000	4,573,027
Canned salmon exports direct from the Columbia river to Great Britain; total direct shipments, 260,241 cases: value	1,190,205	616,207	727,226	1,376,056
Beef and mution exports—canned and uncanned: value	.....	68,473	305,728	123,995
Wheat, flour, and other products exported to China, Sandwich Islands, Puget Sound, British Columbia, Alaska, and elsewhere, except Europe and San Francisco: value	443,976	425,622	326,600	627,826
Bold and silver (products of Oregon mines) exported for the year ending Aug. 1, 1880, estimated only	900,000	900,000	1,800,000	1,360 397
Other products, principally cattle to Eastern States and wool from Southeastern Oregon via Northern California	854,000	426,000	.....	270,000
Total Oregon exports for the year from Aug. 1, 1879, to Aug. 1, 1880	$15,046,861	$12,268,047	$11,571,261	$14,644,972

The subjoined table has been prepared with great care, and shows the number of manufacturing establishments in the State, the number of hands employed, the capital invested, the amount of wages paid, the materials used, and the products manufactured, according to the Census returns of the last four decades:

Items.	1850.	1860.	1870.	1880.
Number of establishments	52	309	969	1,744
Hands employed	285	978	2,324	6,056
Capital invested	$ 343,600	$1,337,238	$4,976,849	$13,474,019
Wages paid	388,620	635,256	1,120,178	2,016,311
Materials	809,560	1,431,952	3,419,756	6,155,560
Products	2,236,640	2,976,761	6,877,897	13,943,130

The following shows the number and extent of some of the principal industries as returned by the Tenth Census; also the average wages paid skilled mechanics and ordinary laborers in the State of Oregon:

MANUFACTURING STATISTICS OF OREGON.

Business.	No. of Estab'ts.	Capital Stock.	Greatest Number of Hands employed at any one time during year.	Average Number of Hands Employed.			Wages and Hours of Labor.					Materials.	Products.
				Males above 16 years.	Females above 15 years.	Children and youth	No. of hours in ordinary day of labor.		Average daily wages for a skilled mechanic.	Average daily wages for an ordinary laborer.	Total sum paid in wages during year.		
							May to Nov.	Nov. to May.					
Agricultural implements	4	$ 85,000	95	77		1	10	9	$2.40	$1.85	$ 9,100	$ 7,072	$ 24,482
Blacksmithing	147	122,225	256	160		2	10	9	3.00	1.70	66,190	108,788	215,440
Boots and shoes	6	73,055	125	96			10	10	2.55	1.65	46,917	105,901	252,588
Bread, crackers, & other bakery products	14	50,150	71	47	2	7	11	10	2.05	1.20	30,800	95,560	156,870
Bricks	22	55,496	271	176	1	2	10	10	2.50	1.50	42,504	19,227	104,160
Carpentering and building	18	37,500	221	150			10	9	3.25	2.05	92,498	228,008	471,288
Cheese and butter	24	151,500	103	68	12	2	11	10	1.25	.85	10,806	21,170	45,288
Clothing—men's	12	45,500	92	45	12		10	10	2.70	1.60	29,151	97,600	115,474
Coopering	10	6,800	26	11			10	9	2.55	1.25	4,788	4,400	16,218
Flouring and grist mill products	100	1,469,700	474	324	1	1	11	10	3.10	1.60	154,941	3,120,978	3,720,894
Furniture—cabinet	22	205,050	152	105	4	10	10	9	2.90	1.75	66,910	81,128	227,288
Iron castings and finishings	10	221,000	240	156		7	10	9	3.20	1.90	134,472	88,564	273,720
Leather—tanned and curried	27	55,500	58	37		4	10	9	2.80	1.60	14,850	28,564	60,174
Lumber, planed	11	68,000	27	23			10	9	2.80	1.60	37,640	60,000	120,000
Lumber, sawed	885	1,377,975	2,000	1,488	9	11	11	10	2.85	1.55	888,888	888,888	2,000,000
Marble and stone work	10	12,100	21	20			10	9	3.25	2.10	14,000	21,000	51,000
Printing and publishing—newspapers	10	87,500	72	58	4	3	10	10	2.85	1.85	32,017	14,000	71,000
Saddlery and harness	6	120,500	107	111		2	10	10	2.80	1.60	60,000	30,000	120,000
Sash, doors, and blinds	21	220,000	197	111		3	10	9	3.05	1.60	70,000	120,000	220,000
Slaughtering and meat packing	9	50,000	52	32			11	11	2.50	1.60	17,150	120,000	220,000
Tin, copper, and sheet iron ware	6	210,150	126	82		1	10	10	2.60	1.65	84,511	120,000	220,000
Watch and clock repairing	3	14,700	3	3			10	10	2.50		2,176	4,000	17,000
Wheelwrighting	24	84,500	80	67		1	10	9	2.60	1.55	12,000	20,000	60,000
Totals	944	$5,000,081	4,954	3,308	45	57	10	9	$2.80	$1.57	$1,627,886	$6,726,819	$9,525,749

The salmon fisheries constitute an important interest to the State. It has been developed but a short time, and yet has grown into an extensive business; a large amount of capital is invested; and it affords employment to a great number of persons. Fish prepared for market, has become one of the principal exports of the State, and an important part of its commerce. According to Professor Goode, special agent of the Tenth Census on Fisheries, 538,587 cases of salmon were packed in Oregon in 1880. This number represents, on an average, three salmon to the case, or 1,615,761 salmon. Each salmon, when fresh, weighs about twenty-two pounds, a total of 35,546,742 pounds. Adding the salmon salted, or consumed fresh, and we have a total of 36,600,000 pounds as an estimate of the total product of the Lower Columbia for the year 1880. Not half a million pounds of this is made of species other than the Quinnat Salmon (*Oncorhynchus chouicha*). The total sum paid by the canners to fishermen in 1880, for salmon, is about $807,880, or fifty cents each. The total value of the pack, estimated at $4.50 per case, would be $2,423,641.50. Below is a table showing the number of cases of salmon packed in 1878, 1879, and 1880, tabulated by rivers or districts:

NUMBER OF CASES PACKED.*

Rivers or Districts.	1878.	1879.	1880.
Columbia	445,000†	448,000	539,587
Sacramento	34,017	18,855	70,000
Frazer's	120,000	74,000	80,000
Rogue		9,000	10,000
Smith's	4,277	4,000	7,500
Eel	10,500		6,250
Umpqua		1,000	
Linalow	12,000		
Gray's Harbor	5,420		
Muckilteo	5,000	5,000	
Seattle			3,000
Alaska	7,750	12,000	10,000
Totals	643,964	566,855	727,337

Much of the area of Oregon has been, within quite recent times, the scene of active volcanic disturbances. It is said that several peaks of the Cascade Range are still smoking. This range is entirely built of volcanic material. The series of

* Many of these figures are merely approximations.
† Cases of 46 pounds each.

valleys lying west of it are floored mainly with the Tertiary formation; while the Coast Range and the spurs connecting it with the Cascades are of the Eozoic age. The narrow strip of low land along the coast is overlaid by the Tertiary formation; while Cretaceous beds appear in the valleys of many of the streams cutting through the Coast ranges. The volcanic mass of the Cascade Range extends eastward up the Columbia, forming the floor of its valley, nearly up as far as the Blue Mountains. This volcanic area, which here in the lower country takes the form of basalt, follows up the Snake river through the gorge by which the stream passes the Blue Mountains, and spreads above this point to a considerable breadth, following up the valleys of many of the branches of the river. The region drained by the Malheur and Owyhee rivers is nearly all overlaid by basalt. The Blue Mountains are Eozoic; while Tertiary appears in several places along its base, including the valley of the Grande Ronde. The region between the head of the Deschutes and John Day rivers is Cretaceous. Most of that part of the State included within the Great Basin is overlaid with Tertiary, through which rise short, isolated ranges of Eozoic rocks. The surface geology of the State is quite complicated, and has as yet been studied only in its general features; as all the information which we have on the subject is derived from a few hurried explorations.

The mineral wealth of the State has not as yet been developed to any great extent. Gold placers have been worked for a long time in Jackson and Josephine counties; and large amounts have been realized from them. In Grant and Baker counties extensive placers and quartz lodes have been discovered. The product of gold and silver averages at present a little over $1,000,000 annually. Copper has been found at several points in the southwestern part of the State, both in combination and native. Iron ore is abundant all over the State. Coal is found in beds of great thickness at Coos Bay, on the Umpqua river, on the Yaquina, at St. Helen, and in several other localities.

CHAPTER XXV.

STATE OF CALIFORNIA.

CALIFORNIA was one of the earliest settled regions of the United States; but it was only when it became a part of the United States that its enormous resources, both of the precious metals and of its soil, were developed. Its rapid settlement, which is without a parallel among the States and Territories of the country, has been due to its enormous deposits of the precious metals; while its present prosperity and the assurance of its continuance are given by its marvelously rich soil.

California is bounded on the north by the parallel of 42° north latitude; on the east by the meridian of 120° west of Greenwich, and by a line drawn from the point where this meridian intersects the 39th parallel of latitude southeastward to the Colorado river, near Mojave City, and the course of the Colorado river. The southern boundary is a line drawn from Fort Yuma, slightly south of west, to the Pacific coast; while the Pacific ocean forms the western boundary. The neighboring States are: On the north, Oregon; on the east, Nevada; and, on the south, the peninsula of Lower California.

This part of the present area of the United States was first discovered by Cabrillo, a Portuguese navigator in the service of the Spanish government, in the year 1542. He explored the coast as far north as Cape Mendocino. Thirty-six years later, Sir Francis Drake, an Englishman, landed on the coast, and took possession of it in the name of Queen Elizabeth. This claim, however, was never sustained; as the Spaniards continued the work of exploration, and rapidly settled in the country. The first settlers entered the country from Sonora, Mexico, by way of Arizona and the deserts of Lower California. The first settlement was made at San Diego, from which colonies were rapidly pushed northward as far as Monterey and the Bay of San Francisco. With these parties of colonists, there were a number of Jesuit fathers, zealous in preaching and proselyting, who

found an ample field for their labors among the mild and peaceable Indians along the coast. Under the influence of these priests the Indians were rapidly converted, and instructed in the arts of civilization; and, at the time that California became a part of the United States, these Indians were very largely in a self-supporting condition.

At this time we find a patriarchal condition of society throughout the southern portion of the State, while the northern portion, north of the Bay of San Francisco, was almost without inhabitants. In Southern California the land was parceled out into huge ranches, which were devoted to the raising of cattle and sheep. Each ranchman had a small army of vaqueros, who were very largely Indians. These, with their wives and families, formed in many cases extensive settlements, over which little kingdoms the proprietors exercised a mild, patriarchal sway. Hospitality was their cardinal virtue. The traveler, whether accredited or not, was sure of a welcome. Everything that the ranch afforded was at his service. Food, shelter, provisions for his journey, a fresh horse in exchange for his jaded one, were furnished him as a matter of course.

The tone of the country was that of easy, affluent indolence—the condition of life to which the genius and disposition of the inhabitants, the climate, and the ease of obtaining the necessaries of life, all contributed. It was a lotus-eater's paradise.

In 1822 the Spanish power in Mexico was destroyed, and with this destruction the power of the Jesuit missions in California began to decrease; but it was not until 1845 that they were finally abolished. Meantime American settlers had been gradually entering the State, and as gradually changing the character of the people and their habits and modes of life. The lazy and indolent Spaniard and Mexican could not hold his own against the resistless energy of the Anglo-Saxon. Hunters, trappers, and gold-seekers were entering the State, but not with that rush which the years of 1848 and 1849 witnessed. Still, at the time of the cession of this country to the United States by the treaty of Guadalupe Hidalgo, in 1848, it contained a considerable element of Anglo-Saxon population.

In October, 1842, Commodore Jones, of the United States Navy, supposing that war had been declared between Mexico and the United States, entered the harbor of Monterey, carried the fortifications, and declared California a Territory of the

United States. He, however, soon discovered his error, and was prompt to apologize and to return the power to the Mexican authorities. In 1846, war having been declared between the United States and Mexico, Monterey was again captured; and after that it was held. The United States troops also took possession of San Francisco, Sonoma, and Sutter's Fort. During the year there was considerable fighting between the United States and Mexican troops in the southern part of the State, which was terminated only by the treaty of peace with Mexico. The State was admitted to the Union on Sept. 9, 1850.

In February, 1848, gold was discovered at Coloma, in a mill race on Sutter's Ranch. The discovery was the signal for the greatest stampede, probably, that the world has ever witnessed. In all parts of the United States, and even in foreign countries, the merchant left his counting house, the mechanic his tools, the farmer his plough, and all joined in the rush to this new El Dorado. Men of all grades and conditions of society, of all trades and professions, and of all nationalities, flocked to the land of gold. The troops stationed in California deserted *en masse;* even the officers, seized with the prevailing fever, threw up their commissions and went to the mines. They went by sea, across the Isthmus, and around the Horn; they made the perilous journey by land. From a few thousands in 1848, composed almost entirely of farmers and cattle raisers, the population increased in four years to over 250,000, a large proportion of which were energetic, daring, reckless men, mad in their pursuit of gold. As a consequence of this rapid increase in population, the prices of the necessaries of life rose to almost fabulous proportions. Labor was in the utmost demand, and commanded extraordinarily high wages. Gambling and its attendant vices were almost universal. Whole squares in San Francisco were devoted to gambling houses; and theft and murder were common in the streets. For a time the worst elements of society had almost unlimited control. Almost any crime could be committed and go unpunished. Finally, however, when this state of affairs became unbearable, the better elements of society organized, for mutual protection, into a vigilance committee; and, after a short, sharp contest with the disturbing element, it was conquered. Many were hung; and the remainder were forced to leave the State to find new fields for the practice of their professions, in Nevada, Montana, and other sections of the West.

It was a desperate remedy, and is only to be excused by the desperate condition of affairs. But, from all accounts, it appears that the vigilance committee used their almost absolute power wisely, and turned it over to the legally constituted authority as soon as this could be done with safety.

The area of the State is approximately 159,000 square miles. Its mean elevation above the sea is about 2,800 feet. The elevation ranges within very wide limits in different parts of the State, from sea level to nearly 15,000 feet in the highest peaks of the Sierras. The following table shows the approximate area lying between contour lines run at intervals of 1,000 feet:

Elevation, ft.	Sq. miles.	Elevation, ft.	Sq. miles.
From sea level to 1,000	43,000	7,000 to 8,000	3,000
1,000 to 2,000	27,000	8,000 to 9,000	2,500
2,000 to 3,000	32,000	9,000 to 10,000	1,000
3,000 to 4,000	18,000	10,000 to 11,000	900
4,000 to 5,000	13,500	11,000 to 12,000	600
5,000 to 6,000	9,500	12,000 to 13,000	500
6,000 to 7,000	6,000	Above 13,000	300

Its surface is extremely varied. Naturally it divides itself into five great divisions: a narrow strip along the coast; the coast ranges, which, running parallel with the coast, have a general northwest and southeast trend; the Great Valley of California, drained by the Sacramento and San Joaquin rivers; the great mountain wall of the Sierra Nevada, and the deserts of the Great Basin, which lie east of the latter. The Pacific coast region is, for the most part, narrow; broadening in certain places, however, with the valleys which run up into the coast ranges. It is an extremely beautiful and fertile portion of the State. Some of the valleys south of the Bay of San Francisco are noted for their vineyards and orchards. The Coast Range, which is more or less continuous from Washington Territory to Lower California, consists of a great complexity of single ranges and ridges, in many places making up a total mountain mass of great breadth. It ranges in height from 6,000 to 8,000 feet in the northern part of the State, down to 3,000 or 4,000 feet near the Bay of San Francisco. South of the bay it again rises to heights of 5,000 feet, decreasing, however, in the southern part of the State, and falling down into mere hills. Within the system of mountains, there are many fine but narrow valleys. The Bay of San Francisco occupies a gap in this system, through which the great water system of the Sacramento finds a place of exit. The Great Valley of California occupies fully

one-tenth of the area of the State; and, with the exception of the counties about the Bay of San Francisco, it contains probably fifty per cent. of its population. Its surface is extremely level, excepting near the margins, where the approach to the mountains is indicated by slight undulations. Its northern half is watered by the Sacramento and its branches; its southern half by the San Joaquin. The former stream has the curious characteristic of flowing upon the summit of a slight ridge, produced by the deposits of its waters. The Sierra Nevada is the mother range of the Pacific slope. Commencing with the Cascade Range, in British Columbia, it stretches, with scarcely a break, to the southern part of California. In Washington, Oregon, and Northern California, it is a volcanic range, above which tower tall, conical peaks, the cones of living or extinct volcanoes. One of these is Mount Shasta, in Northern California. It rises above the surrounding mountains 6,000 to 8,000 feet, its summit being 14,442 feet above the sea level. A hot spring upon the summit shows that the volcanic fires are still slumbering not far beneath. Westward from Shasta run off heavy spurs toward the coast, connecting with the ranges of the Coast system, and forming the northern limit of the Great Valley. Southward the range rapidly falls, and a gap gives exit to the head waters of the Sacramento, known here as Pitt river. Beyond this gap the range rises gradually as we trace it southward. Donner Pass, by which the Union Pacific Railroad crosses the range, has an elevation of 7,091 feet; while peaks in its vicinity rise to 11,000 feet. The highest part of the range is near latitude 37°, where there are many peaks above 14,000 feet in height, and hundreds exceeding 13,000 feet. Passing this culminating region, the range suddenly falls, affording passes at an elevation of between 3,000 and 4,000 feet, and becomes confused with the Coast ranges, which here sweep around to the eastward, forming the southern limit of the great valley. In this region the complexity of the ranges is extreme, and defies analysis. Most of them are low, only one exceeding 4,000 feet in height. This is known as the San Bernardino Range, the central peak of which looks down from a height of 6,000 feet or more upon the arid expanse of the Mojave Desert. To the westward from its crest the Sierra Nevada has a great breadth of foot-hills, descending, by long, sloping spurs, from 13,000 or 14,000 feet nearly to sea level; while on the east it descends much more rapidly,

falling down in many places by precipices or steep slopes from the highest peaks to the arid expanse of the Great Basin. Among the Sierras are many localities of great scenic beauty and sublimity. The first of these is the famous Yosemite Valley, and the less-known Hetchy-hetchy valley. The former is a chasm, eight miles in length, with an average breadth of one mile. Its bottom is 4,000 feet above sea level. The sides are granite walls, rising everywhere very steeply, and in many places perpendicularly, to heights ranging from 1,400 to 4,600 feet above the valley. Among the scenic attractions of this valley, are a number of cliffs more than 3,000 feet in height; eight cataracts, of which one is 1,700 feet in height; and several dome-shaped mountains. The valley is too well known to require description here.

The Hetchy-hetchy is a chasm similar to the Yosemite, but twelve miles distant, upon the Tuolumne river. It is three miles long, half a mile wide, and walled in by granite cliffs, 1,500 to 2,500 feet high. There are, as in the Yosemite, several fine water-falls, among them that of Hetchy-hetchy creek, 1,700 feet high.

In several localities in the western foot-hills of the Sierras, there are groves of the giant Sequoias, or Big Trees. The best-known of these are those in Mariposa and Calaveras counties; but they have also been found in Tuolumne, Fresno, and Tulare counties. The Calaveras Grove contains 150 trees, of which ninety are more than fifteen feet in diameter at the ground, eighty-two between fifteen and thirty feet, and ten which are thirty feet in diameter. The State grove in Mariposa county has been given by Congress to the State as a public pleasure resort. It has 427 trees, of which 134 are more than fifteen feet in diameter, eighteen over twenty-five feet, and three over thirty-three feet.

The fifth district is composed almost entirely of the Mojave Desert, which stretches from the eastern base of the Sierra Nevada to the Colorado river, and is limited on the south by the San Bernardino Range. It is an almost waterless region, if we except a few small springs and the so-called Mojave river, a trickling stream of alkaline water, which, after a tortuous course, alternately sinking and rising again, finally disappears in the sand. The vegetation is extremely limited, being confined to stunted artemisia, cacti in great variety—the most marked

species being the strange form popularly known as the *tree cactus*—the Spanish bayonet, or yucca, and the other species characteristic of an arid region.

The principal navigable rivers of the State are the Sacramento and San Joaquin. The former is navigable for large vessels to Sacramento, and for small steamers nearly to the head of the great valley at all stages of water: the latter is navigable for small steamers to Fort Miller, near the base of the Sierras, at times of flood.

The coast of California is remarkably simple. There are comparatively few bays or harbors. The finest and most commodious harbor of the State, indeed, of the whole Pacific coast, is unquestionably that of San Francisco. It is thirty miles long and nine in width, and almost entirely surrounded by high hills. The entrance, through the Golden Gate, is five miles in length, by but one mile in minimum width. The depth of water at low tide is never less than thirty feet at the entrance.

Next in importance is the harbor of San Diego, in the southern part of the State. It is protected on all sides from violent winds by high hills. Its entrance is one-half mile in width and of a depth sufficient to float vessels of the largest size at all times.

The harbor of San Pedro is inferior, being exposed to southerly winds; and the water near the shore is shallow, so that vessels are obliged to discharge their cargoes by means of lighters. Other harbors, which are more or less exposed, are those of San Luis Obispo, Monterey, Santa Cruz, Half Moon Bay, Drake's, Tomales, Bodega, Trinidad, and Crescent City.

The climate of the State is as varied as its topographical features. The Sierra Nevada forms a sharp dividing line between two characteristically different climates. West of it, there are two seasons—the wet and dry—corresponding to winter and summer. Air currents coming from the equatorial regions of the Pacific, laden with moisture, are met off the northwest coast by cold currents from the Arctic ocean and Behring sea. Chilled by contact with the latter, the moisture is precipitated in immense quantities upon the ocean and upon the adjacent coast. This precipitation is greatest in Alaska, British Columbia, and Washington Territory, and decreases as we proceed southward. In the winter the area of heavy rains reaches the southern part of California; while in the summer it moves northward, leaving

the southern half of California practically without rain, while the northern half receives but a comparatively small supply. The air currents, despoiled of most of their moisture by contact with colder currents, encounter the Cascade Range and Sierra Nevada, and by them are drained of what little remains; and they then continue their eastward course across the great plains and plateaux of Nevada and Eastern Oregon as arid winds. The Mojave Desert is without rain either winter or summer, being cut off from the moist currents during the winter by the Sierra Nevada. Along the coast the annual rainfall ranges from sixty inches in the north down to nine inches near the southern border; that of the Great Valley ranges in like manner from twenty inches to twelve, nearly all of which falls in the winter and spring, when needed for the crops, while the Mojave Desert receives but four to five inches annually.

The temperature also ranges through very wide extremes, its annual mean being modified by the latitude and by the elevation above the sea. In the lower country the annual mean ranges from 53°, on the northern part of the coast, to 75° at Fort Yuma, on the Colorado, in the extreme southeastern part. This is the hottest point in the United States. It is reported that a temperature of 130° in the shade has been recorded there. Along the coast, where the influence of the sea is felt, there is but little range of the temperature between day and night, or between winter and summer. The annual mean along the coast ranges from 53° to 61°; while the difference between the means of the hottest and coldest months is but 15°, and between the highest and lowest known readings of the thermometer is but 73°. At San Francisco the difference in temperature between day and night is seldom greater than 15° Fahrenheit, while the extreme range between the highest and lowest observations on record is but 53°. In the Great Valley, the differences are much more marked, especially in the southern part. The mean annual temperature ranges from 60° to 67°; the difference between the means of January and July is 32°, and, between the highest and lowest known readings, 103°. Across the mountain barrier, in the Mojave Desert, the ranges are very great, amounting to 45° between the means of January and July; while the annual mean ranges from 68° to 75° in this region. The atmosphere is extremely arid, exceeding in this respect all other portions of the country. This aridity extends also to the

southern portions of the Great Valley, where, in the dry season, the ground bakes and cracks, all vegetation becomes parched and burned under the intense heat and aridity, while the ground is covered with the bones of cattle and other live stock which were not driven to the hills for sustenance.

In spite of its equable temperature, San Francisco has not the most delightful climate in the world. For the greater part of the year, *i. e.*, from April to October inclusive, the cool sea breezes which prevail during the afternoon and most of the night, blow dense fogs in from the Pacific. Hence, the Queen City of the Slope is shrouded in mist during a large part of the time. This condition of existence is shared with San Francisco by the whole coast northward to Alaska, and, though to a less extent, by the coast south of the bay.

The fauna of the State is not characteristically different from that of the other neighboring States. In the southern part, it is extremely limited in number, excepting in the most unfrequented localities. In the northern part, game is still abundant in the mountains. Antelope are still to be found on the plains; and black-tailed deer, elk, and mountain sheep are abundant in certain localities. Bears of various species, including the black and grizzly, are not unfrequently met with; and the latter is reported to be much more formidable than the same species in the Rocky Mountains.

The flora of the State varies with the topography. In the valleys of the Coast Range the trees are principally oaks of various species, which grow to a great size and are remarkably graceful. Upon the mountains, pines and oaks predominate, while the redwood, fir, and laurel are abundant. Of the scrubby undergrowth, the manzanita is characteristic of the State; and this, with a species of scrubby oak and other shrubs, forms what is known as chaparral. In places this growth covers the mountains so densely as to make them totally inaccessible. In the Great Valley the principal vegetation consists of nutritious grasses, upon which pasture large herds of cattle and flocks of sheep. On the west slope of the Sierras, there are four well-marked belts of vegetation: the lowest is that of the foot-hills, extending up to about 3,000 feet above the sea. Of these the most characteristic species are the digger pine and black oak, which form a sparse growth, nowhere being dense enough to be called a forest. The next belt is that of the pitch pine, sugar

pine, cedar pine, and spruce. This is peculiarly the forest belt of the Sierras. It is in this belt that the celebrated growths known as the "big trees" are found. It extends from 3,000 feet up to perhaps 7,000 feet above the sea level. The third zone is that of the firs and tamarack pines, which extends from 7,000 to 9,000 feet above the sea, in the central part of the State. The highest belt of all is that of the flexible pine; and the summit of this belt marks the limit of tree vegetation in the middle and northern Sierras. East of the Sierras, the vegetation assumes a different aspect, resembling that of Nevada and Utah. The dead bluish-gray of the sage gives the color to the landscape; and forests disappear.

The arable lands of California are of great extent. Probably more than a third of the area of the State is susceptible of cultivation. Hittell estimates this area at 40,000,000 acres. A large part of this area of 50,000 square miles lies in the Great Valley and in the valleys of the Coast Range. The climate is such that in the northern part of the State irrigation is unnecessary; while nearly all of the land suitably situated for cultivation in the southern part can be irrigated by the abundant streams from the Sierras and Coast ranges. Careful examinations made by officers of the United States Engineer Corps and the State engineer have shown that there is sufficient water flowing into the Great Valley to irrigate its entire extent if necessary. The only parts of the State in which the supply of water is scanty are in the counties of Los Angeles, San Bernardino, and San Diego, and the strip east of the Sierras. In the former the water is now probably used to its fullest extent, and all the land which it is possible to bring into subjection to the use of man is already under cultivation. In San Diego county the supply of water is not sufficient to irrigate a tithe of that which is otherwise suitably situated for cultivation; while in San Bernardino county the existing supply of water is as nothing compared to the vast extent of fertile soil. In the first of these counties, water has become so scarce that recourse has been had to artesian wells; and by this expensive method sufficient water has been obtained to irrigate very considerable areas of garden and vineyard.

The principal product of the State is wheat; and its cultivation is the principal industry of the Great Valley. In barley, California leads all the States. Other grains are cultivated,

however, to a large extent; while the fruit orchards and vineyards of the coast valleys produce no inconsiderable share of the product of the State.

The following table, compiled from the Census returns of 1860, 1870, and 1880, gives the product of the principal cereals:

Crops.	1860.	1870.	1880.
Wheat	5,928,470	16,676,702	29,017,707
Rye	52,140	26,375	181,681
Oats	1,043,006	1,757,507	1,341,371
Indian corn	510,708	1,231,222	1,996,325
Buckwheat	76,887	21,928	22,307
Barley	4,415,426	8,783,490	12,579,561
Totals	12,026,637	28,487,124	45,135,852

From this it will be seen that the increase from 1860 to 1870, was 133 per cent.; from 1870 to 1880, 58 per cent.; and from 1860 to 1880, 275 per cent.

The average value of cleared land in 1880 was $27.16; and of timber land, $8.55.

The average rate of wages paid to farm hands in 1880 was as follows:

Per month, without board	$40 98
Per month, with board	27 13
Transient, in harvest without board, per day	2.31
Transient, in harvest, with board, per day	1 71
Transient, not in harvest, without board, per day	1.95
Transient, not in harvest, with board, per day	1.27

The principal valleys which are of importance from an agricultural point of view, are as follows: The Great Valley, which has already been mentioned. This is three hundred and fifty miles long, with an average breadth of forty miles, and ranges in height above the sea from tide-water to 500 feet. On the western side, it receives few streams; while from the Sierras, on the east, many large streams combine to pour vast quantities of water into the valley. Near the middle of the valley, there is much tule swamp, which, when drained, makes wheat land of almost fabulous richness. South of Tulare lake, there is some alkali; otherwise the valley is almost entirely without it. The entire valley enjoys a warm summer temperature; and most of it is bare of trees. The southern two-thirds do not receive rain enough to ensure the success of crops without irrigation.

On the west side of this valley are several small valleys, land-

locked by the Coast ranges, and tributary to the Great Valley. Among them are the Suisin, Pleasant, Putah, and Cache; while tributary to the Putah are the Berreyesa, Pope, and Coyote valleys; and to that of Cache creek are the valleys of Clear Lake and Long, Bear, and Indian creeks. On the east, the streams from the Sierras have practically no valleys until they debouch into the Great Valley.

Among and west of the Coast ranges, there are many very fine and large valleys. In the southern part of the State, however, but a small proportion of the valleys can ever be cultivated, owing to the scarcity of water. In San Diego county, there are valleys of note on the following streams: Sweetwater and Santa Margarita creeks, and San Diego, San Bernardino, and San Luis Rey rivers. In Los Angeles county, the principal valleys are those of the San Juan and Alisos creeks, and the Santa Aña, Coyote, and San Gabriel rivers. The Santa Aña is the largest stream in the county; and yet its bed is dry for many miles in the dry season. The San Gabriel river also disappears from the surface for a considerable distance during the dry season. The Santa Clara river, too, with a total length of seventy miles, is dry for four-sevenths of its course during a part of the year. The Buenaventura river has a long, narrow valley, twenty miles in length, with an average breadth of not more than one-fourth of a mile. The valley of the Santa Inez river is about thirty miles long and two wide.

The Salinas valley is the largest of all of the coast valleys, ninety miles long, and from eight to fourteen in width. Others in this neighborhood are the Pajaro and the San Lorenzo. These are the principal valleys south of the Bay.

North of the Bay, is first the valley of Russian river, forty miles long and three wide. To this, there are a number of tributary valleys—Green, Dry, Santa Rosa, and others.

Several of the valleys north of Russian river are covered with redwood forests, which are practically ineradicable; and hence the land is of no use for agriculture. The Klamath, which rises in Oregon, has most of its course in this State. The greater part of its valley land, however, is high above sea level, and is more or less exposed to frost.

The San Francisco Basin, lying west of the Diablo Range, is the richest agricultural portion of the State. It extends a distance of 120 miles north and south, with a width of about

twenty-five miles. It is broken up by spurs of the Coast Range into many small and beautiful valleys, generally well wooded, and having very rich soil. Of these the valley of Santa Clara is the largest, being thirty miles long and ten wide at its mouth. The Alameda Plain, lying between the Contra Costa Range and the Bay of San Francisco, has a deep, rich soil, well adapted to the growth of cereals and fruits. Between the Contra Costa and the Diablo Ranges, lies a long valley, known in different parts by different names, as Amador, Livermore, San Ramon, Alamo, and Pacheco. It is drained by a number of different streams, in its different parts, from which the above names are derived.

South of the Straits of Carquinez, is the Napa valley, forty miles long, by two in average breadth. Next to Santa Clara, this is the richest and fairest of the coast valleys. Sonoma valley, fifteen miles by two, has a thin, sandy soil, well adapted to the culture of grapes; while the soil and climate of Petaluma valley adapt it particularly for cereals.

In the Colorado Desert, there is but very little land suitable for farming, owing to the lack of water for irrigation. The Carriso, San Felipe, and Cohuilla valleys have a very dry climate, small rainfall, and are intensely hot in the summer. In the latter, there is a large area, about forty miles long by ten in width, which is below sea level. At times of very high water in the Colorado, this area is filled by the water of this river overflowing the low divide which separates them. A plan has been on foot for some time for cutting a canal through this divide, and thus keeping a lake permanently in this valley, with a confused idea, that, somehow, its presence will lessen the aridity of the climate and increase the rainfall. How it is to effect this desirable result, however, is not so clear; and, reasoning from analogy, it does not appear probable that such a result will follow. The presence of the Gulf of California does not appear to ameliorate the climate of Southern or Lower California or Arizona. Indeed, although bordering upon the sea and the gulf, Lower California is as arid a region as there is on the globe.

In the Mojave Desert, also, there is little arable land. The narrow valley of the Mojave, that of Tehachipi, Owen's valley, and Mono valley, all have small areas of good land. The Amargosa, which sinks in Death valley, has no arable land of any consequence.

The principal disadvantage of farming in California, which it shares with all the States and Territories of the Cordilleran region, is the necessity of irrigation. This is an absolute necessity in the southern half of the State; and, in the northern half, while not a necessity during a majority of seasons, still farmers are finding that it pays to insure their crops against drought by providing means for artificial watering.

Wheat is sown from November 1 to April 1; but the bulk is between January 1 and February 15. The most certain crops are those sown early, as they get the full benefit of the winter rains; while the largest crops are generally those sown late. It is usually sown broadcast; the harvest is from the middle of June to that of July. The sowing of barley generally precedes that of wheat, taking place at any time during the latter part of the fall and the winter; and it is usually sown broadcast. The harvest just precedes that of wheat.

As a fruit-growing State, California ranks very high, as far as quantity is concerned. The quality, however, of many fruits, is decidedly inferior to the Eastern fruits. Apples, peaches, strawberries, pears, plums, apricots, grapes, and olives are produced in large quantities.

Of the fruits of temperate climates, there are about 400,000 trees, distributed as follows:

Apple	2,446,000	Plum	243,000
Peach	835,000	Cherry	122,000
Pear	356,000		

Of the sub-tropical fruits and nuts, there are about 250,000, including almonds, walnuts, figs, oranges, olives, and lemons.

The grape and wine interest of the State is a very important one, and is rapidly growing. The grape region extends from the southern boundary northward to latitude 41°, with an average breadth of 100 miles. It is estimated that there are 21,000,000 grape vines in the region roughly outlined above. They are distributed by counties somewhat as follows:

Los Angeles	4,000,000	Tuolumne	1,500,000
Sonoma	4,000,000	Santa Clara	1,000,000
Napa	2,000,000	Amador	1,000,000
Sacramento	2,000,000	Butte	800,000
El Dorado	1,500,000	Placer	800,000
Solano	1,500,000	San Joaquin	800,000

The following table shows the production of wine for several years preceding 1872, in gallons:

1860	400,000	1869	2,000,000
1863	800,000	1870	3,700,000
1867	1,800,000	1871	4,542,000
1868	2,600,000		

The grapes ripen about the middle of September; and wine making immediately takes place. There are several kinds made, among them the "dry," "sweet," "still," "sparkling," "mission," and "foreign." Most of them are strong, and wanting in delicacy of flavor. The "sparkling" wine, or California champagne, is now being produced quite extensively. The area which is fitted to produce these wines is larger than that of France, which produces 20,000,000 bottles annually.

Before the discovery of gold in California the State was given over mainly to the raising of cattle and sheep. The flocks and herds pastured over the whole extent of the Great Valley and the hills and valleys of the Coast Range. Cattle were so abundant and the market so distant that they were valued only for their hides. With the advent of the gold-seekers, this industry languished; and, while it is still a pursuit yielding great and certain profits, it no longer has a primary importance. The great pastures of the State are being rapidly transformed into vineyards and wheat fields. Still, with the growth of other industries, this has not been neglected. The yield of wool in 1872 was 23,000,000 pounds, an increase of 3,700,000 pounds since 1870. In 1873, the State contained 4,000,000 sheep, whose clip was 30,000,000 pounds, according to the State statistical report. In 1880 the Census showed that there were in the State six and a quarter millions of sheep, a greater number than in any other State or Territory.

The number of cattle has been decreasing since 1860, when the number was 1,100,000. The cattle region at present is in the southern part of the Great Valley; though there are many thousand head scattered about the other sections of the State. In 1880, the number reported by the Census was 800,000, being less than in Texas, Kansas, or Nebraska, and the same as that of Colorado.

The dairy products of the State amounted, in 1872, to 7,500,000 pounds of butter. The principal dairy section consists of the counties about the Bay, which are accessible to a market. The annual product of cheese is 3,400,000 pounds.

Of swine, the State contained, in 1880, 1,100,000. In this branch of live stock, it was exceeded only by the States of Texas, Nebraska, and Kansas.

The following figures have been obtained by the State Commission of California as the total number of pounds of salmon taken in the Sacramento river for the six years ending Aug. 1, 1880:

1875 (Aug. 1, 1874, to Aug. 1, 1875)	5,089,781
1876	5,991,423
1877	6,423,563
1878	6,520,703
1879	4,432,259
1880	10,667,400

Bee culture has attained to considerable importance as an industry in the State, although at first it was not supposed that these insects would thrive in so dry a climate. There were, in 1877, about 30,000 hives, and their number was increasing rapidly. It is not rare for a single hive to make 200 pounds of honey in one season.

The geology of the State, in its great general features, is comparatively simple, and is indicated to a large extent by the topography. A glance at the map of the State shows three broad belts parallel to the coast, roughly outlining severally the Sierra Nevada, the Great Valley, and the Coast ranges. As was stated above, the Cascade Range, which enters the State from Oregon, and extends down to the gap of the Pitt river, is a volcanic range. Beyond the gap of Pitt river, for a distance of fifty miles or more, basalt predominates in the range. Farther southward the mountains are made up of Eozoic rocks, with here and there an outflow of volcanic material and an occasional outcrop of the Silurian formation. Below the foot of the Great Valley, the Coast ranges also are of Eozoic rocks—as well as the minor ranges which traverse the Mojave Desert. The Great Valley of California is entirely overlaid with the Tertiary formation, excepting that near its upper end outcrops of Cretaceous are seen at the base of the Sierras. The northern part of the Coast ranges are also Eozoic; while from the latitude of 40° southward they are made up of Cretaceous as far as the southern end of the Great Valley. The valleys in the Coast Range are mainly, like the Great Valley, of Tertiary rocks.

To its mineral resources, California owes mainly the proud position which she holds to-day in the sisterhood of States. To that is due directly, not only its rapid growth and development, but the energetic character of her population, which has enabled her to overcome the obstacles in the path of her growth

and development which otherwise might have proved insurmountable. To that element is due her magnificent system of railroads which to-day connect the most distant parts of the State as well as unite her to the rest of the country.

The first mines discovered were, as everywhere else, placers. The principal of these have been found at the eastern base of the Sierra Nevada, from the middle to the northern part of the valley. During the rush from 1849 to 1853 and 1854, the yield from these mines was enormous; while many of them are still worked with profit by the hydraulic process. The cream, however, was long ago skimmed; and profits from the placers, even in moderate amount, are now to be obtained only by large expenditures of capital. The principal quartz mines are found in the Sierras; and, while they do not at present constitute the principal wealth of the State, still the gold and silver product of California makes her rank among the first as a bullion-producing State.

The gold mines of California were discovered in January, 1849. They reached their greatest production, which was $65,000,000, in 1853. The total production of gold in the State, up to June, 1873, is estimated by Hittell at $1,000,000,000.

The following table, taken from the circulars of Messrs. Wells, Fargo & Co., gives the total production of gold, silver, and lead, during the past four years:

1877	$18,174,716	1879	$18,190,973
1878	18,920,461	1880	18,976,166

showing an average of between eighteen and nineteen millions, which has been very constant. Of this, at least nine-tenths is gold.

The following are the mining counties of the State:

Amador,	Klamath,	Plumas,	Siskiyou,
Butte,	Mariposa,	San Bernardino,	Stanislaus,
Calaveras,	Mono,	San Diego,	Trinity,
Del Norte,	Nevada,	Shasta,	Tuolumne,
El Dorado,	Placer,	Sierra,	Yuba.
Kern,			

These counties, it will be noticed, are distributed very generally over the State, with the exception of the Pacific coast, which is almost without representation.

This State has been, and is yet, the scene of the most extensive placer mining upon the continent. Not only has more gold been taken out of these mines than from those of any

other State; bnt, also, it may be as confidently asserted that more money has been sunken in great hydraulic schemes than anywhere else. Placer mines may be grouped into many classes. The first and most apparent classification is into shallow and deep ones; *i. e.*, those in which the pay-dirt is at the surface, and those in which it is covered to a considerable depth. Again, they may be classified, according to their position, as hill, flat, bench, or bar placers. The first are those in which the pay-dirt is in or on a hill. Flat diggings are on a flat; bench diggings, on or in the river bench or bluff; and bars are parts of the high water channel of streams, left dry by the recession of the water. Placers have also been extensively worked in the beds of streams, by diverting the channels. Placers may also be classified by the means employed to work them. There are sluice claims, hydraulic claims, tunnel claims, dry washings, etc.

Placer mining is entirely mechanical, if we except the chemical action of the mercury in the sluices, in dissolving the gold. The sluice is a long, narrow box, open at the top, set on a slight incline, and with cleats across the bottom at short intervals. The pay-dirt is thrown into the head of the sluice, along with a stream of water, sufficient, with the slope, to wash the gravel and sand down. As the stream carries the dirt down, the particles of gold, being heavier than the dirt, fall to the bottom, and are caught against the cleats or "riffles" where mercury is placed to dissolve them.

To bring water to a valuable placer, in many cases, very extensive works have been constructed. Wooden flumes, many miles in length, have been built; while at present, iron pipe seems to be coming into use for the purpose of making flumes. In 1871, according to the report of the State Surveyor General, there were 516 mining ditches, with an aggregate length of 4,800 miles, and giving a daily supply of water of 171,000 miner's inches. There are single hydraulic claims which use 3,000 miner's inches daily, or 60,000,000 gallons per day.

The methods of breaking up placer ground and getting it into the sluices, vary with circumstances: on the one hand, we have the laborer with pick and shovel; on the other, a stream of water, under a pressure of several scores of feet head, projected against the face of the bank. The latter, known as the hydraulic method, is by far the most effective for operating upon

a large scale. Many placers which, worked in a small way, could not be made to pay, have proved very remunerative under this system. On the other hand, it requires a heavy expenditure of capital before anything is realized.

Gold quartz mining is carried on very extensively in various sections of the State. It is probably quite as important in its product as placer mining. It is one of the most uncertain of occupations; and no amount of experience, scientific knowledge, or prudence, will fully insure the investor against loss.

Among the quartz mines which have paid largely may be mentioned the following:

Mines.	Counties.	Total Production.	Mines.	Counties.	Total Production.
Princeton Mine...	Mariposa	$4,000,000	Empire Mine.....	Nevada..	$1,200,000
Morgan Mine	Calaveras	3,000,000	Houston Hill....	Nevada..	1,000,000
Eureka Mine.....	Nevada..	3,000,000	Osborn Hill.....	Nevada..	1,000,000
Allison	Nevada..	2,300,000	Gold Tunnel....	Nevada..	1,000,000
Massachusetts Hill	Nevada..	3,000,000	Sierra Buttes....	Sierra ...	2,500,000
Fellows Mine	Nevada..	1,000,000	Eureka	Plumas..	1,600,000
Gold Hill.....	Nevada..	4,000,000	Mammoth.....	Plumas..	1,000,000

Silver has been found in many parts of California; but the only paying mines are east of the crest of the Sierra Nevada. Of these, the most productive are at Cerro Gordo, Inyo county. Others are in Alpine and Mono counties.

Coal is found at several points, but not in quantity sufficient for the needs of the State. The principal mines are in Monte Diablo, which produced, in 1872, 175,000 tons; and at that time the production was rapidly increasing.

Copper is abundant in various localities; while one of the principal sources of mercury in the world is in a few mines located in the Coast Range, known as the New Almaden and New Idria Mines. Lead, in the form of galena, is abundant in most parts of the State. Petroleum has also been discovered in a few localities.

In 1850, the population of California was given at 92,597; in 1860, at 379,994; in 1870, at 560,247; and in 1880, at 864,686. Of this number, 572,006 are native born, and 292,680 of foreign birth, there being no less than 51,167 foreign born to every 100,000 native. Over two-thirds of the 105,717 Chinese in the United States are in California.

Among the foreign element are a number of Irish, Germans, Austrians, English, British colonists, Spaniards, Spanish Americans, and French. It is said on good authority that not one in twenty of the adult Californians to be met with in the larger towns is a native of the State; and nearly all of those who occupy prominent and influential positions in society and business have come from a distance. Every State in the Union, every country in Europe, all the British colonies in North America and Australasia, all the countries of Spanish America, and many of the Polynesian islands, are represented. The long and costly journey demanded either money or an adventurous disposition, or both. The people as a class are unequaled in their general intelligence and enterprise. The journey in pioneer times was in itself sufficient to educate a man; and, after his arrival in California, he found himself among a mixed population who had to make allowances for strange customs, and in new conditions, which required new modes of working and new habits of life. The migratory habits of the miners, the large profits of the business, and the small proportion of women (there being, in 1880, only 66,841 women to 100,000 men), have all exercised a strong influence on California society, which, even among the poorest and most ignorant class, has a liberal and cosmopolitan tone. According to Hittell, persons who have lived in California from fifteen to twenty-five years are proud of their State, and carry their pride so far that it is observed as something exceptional in the United States. It is perhaps partly on account of their State pride that the Californians are cordial and hospitable. They want travelers to carry away good impressions of the country. The enjoyment of life is a prominent purpose of Californian society; while religion, social display, and the accumulation of money are less noticeable than in most other countries. The prevalent mode of living is luxurious; and the habits are expensive. In no place is society more free and cordial and ready to give a friendly reception to a stranger than in California. The new comer is looked upon with favor; and nobody cares whether he belongs to a distinguished family, has moved in a fashionable circle, or possesses wealthy or influential friends or relatives. In no part of the world is the individual more free from restraint. High wages, migratory habits, and bachelor life are not favorable to the maintenance of stiff social rules among men; and the tone of society among women must

partake, to a considerable extent, of that among men, especially in a country where women are noticeably in the minority and therefore much courted.

Life in California is very public. Many of the people live in hotels and at large boarding houses. Travelers are numerous; theatres and balls are abundant, and well attended; the population is excitable; all take the newspapers and are interested in the events of the day; and the history of the country is full of eventful incidents. Money is abundant and easily earned, and of course spent freely; and the favorite method of spending it is in public festivals and attending places of amusement.

It is gratifying to get at some truth on the Chinese question. The reader will remember, during the agitation of 1876 and 1877, the ridiculously exaggerated statements relative to the increase of Chinese immigration. About that time, Gibson, in his "Chinese in America," declared that there were 200,000 Chinese in California, and at least 75,000 in the city of San Francisco. Others came out with "careful estimates" showing from 150,000 to 275,000; and other authorities said that the yearly excess of arrivals over departures was not less than 18,000, and that the ratio of this number was annually increasing. As late as 1879, it has been asserted in Congress that "these people have come in hundreds and thousands, until their number has been increased in the State of California to 150,000."

Without undertaking to discuss the merits or demerits of Chinese immigration, I call attention to the facts in the case as revealed by the Census, which will enable the reader to decide for himself whether or not there is any cause for serious alarm, and whether it is probable, as one anti-Chinese orator asserted, that in half a century the Asiatics will outnumber the Americans on this continent. The utter worthlessness of these exaggerated declarations is shown by the returns of the Census, in which the total number of Chinese in the United States is given at 105,463. Almost without exception, they are engaged in industrial or commercial pursuits; are an orderly, law-abiding people; and are entirely self-supporting, scarcely ever found in almshouses, jails, or penitentiaries. These observations are verified by official statistics, municipal, State, and National. So that all valid objections against Chinese immigration must be sought outside of the Census. The following table shows the distribution of Chinese in 1870 and in 1880:

STATE.	1870.	1880.	STATE.	1870.	1880.
California	48,790	75,095	Colorado		610
Idaho	4,267	3,379	Louisiana		481
Oregon	8,826	9,513	Massachusetts		287
Nevada	3,143	5,490	Illinois		210
Montana	1,949	1,764	Dakota		223
Utah	445	501	Other States & Ter.	388	1,486
Washington	234	3,182			
Wyoming	143	214	Totals	63,074	105,465
Arizona		1,630			
New York		224			

As regards the Chinese population in Oregon, the increase has been much greater, being 186 per cent.; in Nevada the increase has been seventy-two per cent. In Washington Territory the number of Chinese increased from only 234 in 1870 to 3,182 in 1880—an augmentation of 2,948. In Idaho, a decrease of twenty per cent. is noted; in Montana, there has been a small decrease of two per cent. In 1870, so far as the Census revealed, the total number of Chinese in all States and Territories other than those mentioned above was only 388. Since then the industrious Chinaman has forced his way into the mining camps of Arizona, where 1,630 were enumerated; into the back alleys and basements of the great metropolis of the country, where nearly 1,000 have been found; and into the silver mines of Colorado, where 610 are given. North Carolina and Vermont are the only two States in which no Chinese are returned.

California has an excellent system of State schools, open without charge to all children between five and fifteen years of age; and the system of instruction and the general management of the departments are reported to be little if any inferior in manner to those of Massachusetts. The teachers are mostly natives of the Eastern States, and are highly capable. The State school tax, according to the Census returns of 1880, amounts to $1,362,005; and the county school tax, exclusive of San Francisco county, was $572,555.

The report of the Tenth Census shows that the total assessed valuation of real estate is $466,273,585, and of personal property, $118,304,451; making a total of $584,578,036. This valuation is according to the assessment made by the county assessors, and equalized by the county boards of equalization under the direction of the State Board. In it every species of property is given. Under the head of personal property is included every

thing which is a subject of ownership, which is not included under the heads of real estate and improvements. Hence the franchises of corporations are included in this total.

The revenue laws of California declare that "all property must be assessed at its full cash value." By this term is meant the amount at which the property would be taken in payment of a just debt due from a solvent debtor. This definition was taken from the Revised Statutes of New York, and incorporated in the Political Code. Personal property is probably assessed at fifty per cent. of its true value; and probably not more than one-half of all the personal property is discovered by the assessor.

The amount of fire insurance written up in the State on December 31, 1879, and continuing in force on the first Monday in March, 1880, was $225,664,839. The assessed value of improvements in 1880 was $111,536,929; the assessed value of insurable personal property was $104,874,755; making a total of $216,411,677. According to these figures, the improvements upon real estate and insured personal property were insured in 1880 for $9,253,162 more than they were assessed. Taking the assessed value of real estate to be seventy-five per cent. of its true value, and the assessed value of personal property to be fifty per cent. of its true value, and not counting the personal property which has escaped assessment, the total estimated true valuation of property in California would be $858,307,014.

The average per capita assessed value of property in the different counties of California is $676.05. The richest county is Kern, with a per capita of $1,072.21; next comes San Francisco, $1,045.60; next, Alpena, $1,002.23; next, Colusa, $946.81; Merced, $933.51. The bonded indebtedness of the counties in California, exclusive of San Francisco county, in which the county and city are co-extensive, is $5,631,212, and the floating indebtedness, $1,992,932; making a total of $7,614,144. State taxation for purposes other than schools aggregates, for 1880, $1,858,112. Taxation for county purposes amounts to nearly double this sum, or $3,486,818.

The following tabular statement shows the population of the cities of California of 7,500 inhabitants and over for the last three decennial periods, the total assessed valuation of real estate and personal property in 1880, the estimated true valuation, the total tax levy, and the total debt:

Cities.	Popul'n 1860.	Popul'n 1870.	Popul'n 1880.	Total Assess'd Value of R. E. and Personal Property.	Estimated True Value of Real Estate.	Total Estimated True Value of R. E. and Personal Property.	Taxation. Total Levy.	Total Debt.
Los Angeles	4,379	5,728	11,311	$ 3,534,141	$ 9,500,748	$13,784,885	$ 169,810	$ 310,371
Oakland	1,543	10,500	34,555	16,168,775	40,000,000	60,000,000	870,000	654,000
Sacramento	13,787	16,283	21,420	19,000,125	30,000,000	70,000,000	1,000,000	1,350,000
San Francisco	56,802	149,473	233,956	244,277,300	327,321,012	417,154,000	6,000,000	4,161,500
San José	.....	9,089	12,567	6,000,000	10,000,000	15,000,000	200,000	.....
Stockton	3,670	10,085	10,297	6,011,085	4,035,201	8,441,325	109,000	885,615
Totals	79,826	201,159	324,097	$304,161,226	$420,856,960	$611,215,210	$7,998,810	$7,115,015

The bonded indebtedness of the cities of California is very small. Below it is given, irrespective of any sinking fund or credits (the city of San Francisco alone having some $900,000 credit for the payment of debt):

Los Angeles	$ 304,000	San José	$ .....
Oakland	654,000	Stockton	885,615
Sacramento	1,350,000		
San Francisco	4,161,500	Total	$7,055,115

Below, I present in parallel columns the amounts of bonds issued since 1860, and the amounts maturing each year until the next century. The following table shows the amounts of bonded debt issued and maturing in years named:

Amounts Issued in Years Named.		Amounts Maturing in Years Named.	
Previous to 1860	$2,084,000	1880	.....
1860	.....	1881	$197,000
1861	.....	1882	130,500
1862	.....	1883	402,000
1863	404,500	1884	92,000
1864	379,000	1885	173,000
1865	215,000	1886	.....
1866	197,000	1887	242,000
1867	246,000	1888	994,000
1868	97,500	1889	15,000
1869	85,000	1890	223,000
1870	431,000	1891	210,000
1871	170,000	1892	80,000
1872	305,500	1893	645,000
1873	260,400	1894	542,000
1874	721,000	1895	321,000
1875	1,088,000	1896	73,000
1876	8,000	1897	365,213
1877	190,215	1898	400,000
1878	70,000	1899	748,000
1879	11,000	1900	.....
1880	6,000	After 1900	317,000
Total	$7,055,115	Total	$7,055,115

It will be interesting to note the purposes for which this bonded debt was issued. Following are the amounts of bonded debt issued for the purposes named:

Funding floating debt	$ 1,487,500	Refunding old debt	$1,985,615
Improvment of harbors, rivers, and water power	130,000	Schools and libraries	842,500
Parks and public places	475,000	Sewers	195,000
Public buildings	1,156,000	Total	$7,055,115
Railroad aid	783,500		

Following are the amounts drawing rates of interest named:

10 Per cent	$ 231,000	6 Per cent	$3,715,000
8 " "	768,615	Total	$7,055,115
7 " "	2,340,500		

The following table shows the principal industries of California in 1880:

Business.	No. of Establishments.	Capital, Dollars.	Average number of hands employed.	Total Amount Paid in Wages during the year, Dollars.	Materials, Dollars.	Products, Dollars.
Flouring and grist mill products	149	4,346,985	643	543,777	10,947,283	13,126,580
Gun powder and high explosives	6	2,434,000	200	122,705	913,216	2,155,005
Leather curried	92	494,150	218	127,655	1,073,351	1,954,320
Leather tanned	77	1,799,900	657	327,055	3,096,103	4,193,793
Machinery	54	1,095,899	1,143	662,705	1,113,931	2,174,545
Sugar and molasses, refined	3	1,700,000	310	305,000	5,532,000	5,962,000
Totals	358	11,741,034	3,437	2,054,905	23,183,884	29,544,349

There are 2,220 miles of railroad in the State of California. The cost of the first 1,550 miles of these railroads is estimated at $113,000,000. According to Nordhoff, one of the most notable and remarkable objects in California is the Central Pacific Railroad. He characterizes this magnificent and daring piece of engineering as more famous than any European public work: "You take the cars of the Central Pacific Railroad," says Mr. Nordhoff, "at Ogden, at a level of 4,200 feet above the sea; and the locomotive draws your train over many miles of an alkali desert, in parts of which water had to be drawn forty miles for the men who built the road; up the Sierra to a height of 7,017 feet, where the snow lay sixty feet deep one winter while the road was building, and where they actually dug tunnels through the snow and ice to work on the roadbed; down from the summit, around cliffs, along the edge of precipices, through miles of snow-sheds, through tunnels and deep rock-cuts, across

chasms where you shudder as you look down into the rushing torrent far below—and all this, until you reach the plain of the Sacramento, through a country even yet almost uninhabited, believed ten years ago to be uninhabitable, presenting at every step the most tremendous difficulties to the engineer as well as to the capitalist." The story of the building of the Central Pacific Railroad is one of the most remarkable examples of the dauntless spirit of American enterprise; and it is greatly to be regretted that the limits of this chapter prevent my going into the details of its history.

The commerce of California is exceptionally active. According to Hittell, no country of Europe, and no other State of the new world, consumes so large a proportion of foreign merchandise. Her annual exports range from $65,000,000 to $75,000,000; and the cost of imports is the same. The value of imports from foreign countries is about $20,000,000; and that from other portions of the United States, about $30,000,000; the freights and charges on imports are $5,000,000; and the duties exacted by the Federal government, $8,000,000. San Francisco, in the amount of its foreign importations, is the fourth city in the Union, being inferior to New York, Boston, and Baltimore, and superior to Philadelphia and New Orleans. The commerce of this city will be treated of farther along in this volume.

CHAPTER XXVI.

PROGRESS OF WESTERN CITIES.

POPULATION seems to seek life for the brain; and such inducement as our cities afford proves too attractive for the rural population. The tendency of modern civilization is to mass population. The strong lights and shadows of our cities, the love of society, the satisfaction of better shelter, better roads, stronger institutions, lead men to crowd together even when unable to be anything but dependents in the system to which they unite themselves. Great enterprises demand massed efforts. The individual often sinks his own will, his own property, his own happiness, present and prospective, in the tenement house of the city, when he might have been an independent man, with a fair competence, had he been content with a rural life. The pre-eminent success of the few in the vast commercial enterprises, in manufactures, in public affairs, tempts those in scattered homes to the centres of population; and hopefulness keeps them there till many of them can not get away. I have referred in the first chapter to the rate per cent. of growth of Western cities. The following table shows the total population of the cities of the entire West in 1860, 1870, and 1880, also the total assessed value of property, the total tax levy, and the total debt:

STATES.	No.	Popula'n 1860.	Popula'n 1870.	Popula'n 1880.	Total assessed value.	Total tax levy.	Total debt.
Ohio	21	380,800	538,019	760,582	$350,080,918	$10,072,990	$41,408,429
Indiana	12	90,618	161,801	232,988	132,979,079	2,79[illegible],990	7,274,843
Illinois	22	207,761	503,985	770,944	178,210,896	7,192,741	18,750,899
Michigan	15	94,007	180,149	279,419	183,521,709	2,604,430	6,443,695
Wisconsin	11	59,698	140,398	227,208	91,295,796	1,989,647	3,660,298
Minnesota	4	17,808	44,419	107,647	53,394,539	982,395	3,034,815
Iowa	10	35,871	113,289	152,576	62,116,406	1,462,513	3,257,018
Missouri	6	163,807	362,944	467,871	186,342,105	4,982,[illegible]	27,651,807
Kansas	4	12,449	30,127	55,616	9,307,498	355,597	1,765,774
Nebraska	3	1,801	18,594	43,329	6,965,901	425,511	477,365
Colorado	3	4,749	4,759	50,450	18,027,419	695,813	132,000
Utah	1	8,207	12,854	20,768	7,304,325	194,174	97,000
Nevada	1	2,345	7,048	12,705	4,180,400	178,484	113,000
California	6	79,305	201,120	394,097	204,161,256	7,[illegible],478	7,118,913
Oregon	1	.....	.....	17,078	13,148,425	280,301	78,500
Totals	116	1,203,561	2,975,709	3,544,850	$1,559,708,896	$41,869,594	$120,418,329

In the detailed chapters, it has been the aim to give the population, assessed value, total tax and debt of each city; and the above is simply a bringing together and presentation in compact form of these facts.

At the close of the Revolutionary war the public attention had been already drawn to the rich resources of the Mississippi valley. Even before the constitution was framed, a plan of government had been adopted for so much of the Prairie States as the English owned after the French war. Virginia retained her control of Kentucky lands long enough to separate them in association and in destiny from those which she claimed north of the Ohio and east of the Mississippi, but which she relinquished to form the Northwest Territory. Population had followed the water-courses, and spread over the eastern part of the region, so that a State was almost ready for organization at the opening of this century.

At that time, steam travel, upon land or upon water, exercised no influence; wagon roads were but the local convenience of the denser settlements, and had little influence in directing emigrants, who found the beautiful Ohio a highway ready for their use, to bear rudely made craft westward. The Lakes tempted a bolder class of travel, and those who could afford to equip more permanent boats. The system of lakes upon the north, and the rivers upon the south and the west, together with their intersections, determined the course of the earlier migrations.

It may be seen on a good map, that, passing from the Ohio up the Beaver, close to the eastern boundary of Ohio, we can ascend the Mahoning and approach the headwaters of the Cuyahoga. Other rivers flowing into the Ohio, rise near rivers draining into the lakes. The mouth of the Great Miami fixed the location of Cincinnati. The Great Miami interlaces its sources with those of the Maumee. Going up the Wabash and the White, we shall easily get to the Maumee and to Lake Erie, or, reversing the order, pass from the lake to the Ohio. The Illinois river, as followed from the Mississippi up its northern fork, the Des Plaines, would bring one within a few steps of a river that poured into Lake Michigan, either the little Chicago creek, or the swampy Calumet, near the head of the lake. Still farther north, going from the Mississippi, only short portages were needed to cross from the Rock river or from the Wisconsin to

the streams flowing to Lake Michigan; a convenience to Indians and to hunters; but such routes north of the Illinois river were of less value in directing settlers. The relations of the waters, the natural highways just indicated, determined the course of early migration and of those first great efforts for better public ways, the canals.

The Mahoning and the Cuyahoga being linked by a navigable artificial channel, a similar one from the Cuyahoga reached the Ohio by way of the Scioto at Portsmouth. The spade opened ways from the Maumee to the Great Miami, and by way of the White to the Wabash, and so to the Ohio. The early French explorers, the first traders with the Indians, the pioneer shippers of pork and flour, made use of the waterway by the Illinois to the Des Plaines and the Chicago streams in high water; and years later, a canal, enlarged from time to time, has but emphasized the indications of nature.

The places where the form of transportation changed had the element of prominence in prospects for future growth. Leaving this, I pass to a second general feature that determined the massing of population. In the southern latitudes of the Great Lakes, harbors are mainly practicable where streams have broken an outlet through the usual contour of the shore. The mouth of the Cuyahoga had an early nucleus of the present Cleveland; the germ of Toledo was amid the Maumee swamps; Detroit marked a break between the Great Lakes; and a trading post foreshadowed Chicago. On the Ohio river, a city might have been expected at the mouth of the Beaver; but other circumstances gave Pittsburg its advantages. Portsmouth had early promise, and is hopeful even now; but Cincinnati has the lead as a metropolis for all that region, located by the natural reasons I have suggested. It is necessary to look for a moment at the hindrances to the operation of the causes named for growth of population at spots determined by these causes. Lake Superior not only reached inhospitable latitudes, but emptied by a formidable fall of some twenty feet. Cities were not to be expected on its shores till the accumulated resources of civilization were brought to bear.

The mouths of rivers were often in such swampy surroundings that pioneers must select more convenient spots, even with added travel. The mouth of the Wabash has never fixed a large population nearer than Evansville. The mouth of the Ohio has a

city only by enormous outlay of individuals and of corporations. The mouth of the Missouri has no city; nor has the mouth of the Illinois: Chicago and Toledo would have been left to frogs and to rushes, had they not each been situated where advancing civilization could not pass them, and they must grade up and drain and drive piles and build wharves and warehouses. Moreover, changes come in the development of resources at first unavailable. The abundant richness of the soil exercised but a general influence in massing population in pioneer times; and coal mines lay long unnoticed.

Rich mineral wealth will tempt men to swarm like bees, even though to go again as fickle as the insects, unsatisfied with their hive. So it was that about 1825 Galena was more than Chicago, and Dubuque, that had been abandoned after the death of the Frenchman from whom it was named, had a new foundation. Galena was a little removed from the great Mississippi, which gave Dubuque a double advantage; although steamboats could reach Galena lead piled on the banks of the Fevre. Great mineral wealth, easily developed, gave the name of Potosi to a locality in Missouri which was so difficult of access that outfits and shipments of its product centred at St. Louis, adding to the prominence of that city. The precious metals drew men to the mountains and the Pacific cities; and coal and iron mines have sometimes turned the tide of population.

Something of an impetus is given to centralizing population by the selection of a locality as a State capital. Columbus, Ohio; Vincennes and Indianapolis, in Indiana; Kaskaskia, Vandalia, and Springfield, successively, in Illinois; Jefferson City, in Missouri; Lansing, in Michigan; Iowa City and Des Moines, successively, in Iowa; Madison, in Wisconsin; St. Paul, in Minnesota; successive selections in young Kansas, resting at last with Topeka; and first Omaha, then Lincoln, in Nebraska — each had some prestige as a capital city.

I turn aside from this thought a moment to call attention to another influence that aided progress back from the watercourses, and which strongly illustrates the steps by which we have reached from the condition of a virgin wilderness to the present dense population, with modern roads and swift transportation. It was once so tedious to reach the National Capital from the remote States of the West of that day, that a National road of the most advanced type was projected at the expense of

the government, to connect the National Capital with the Western capitals. Leaving the Ohio river at Wheeling, it was surveyed through Columbus, Indianapolis, and Vandalia, to the Mississippi. The device of MacAdam, to make roads with pounded stone, was then a new one: he taught the British public to make roads only so long ago as 1820. The road was completed to Columbus; grading and bridge building were done to Vandalia, when the shriek of the locomotive on the Atlantic coast foretold a better way in the near future; and the work was abandoned in Jackson's administration.

Communities, like individuals, must not depend upon advantages which they do not improve. A capital which is but a capital is soon outstripped by cities to which other advantages may be far more useful. Kaskaskia and Vandalia, for a time relatively important, never had a large population; Springfield gains by manufactures; Madison, most beautiful of situation, with lakes all about it, has neither manufactures nor commerce to carry it above the moderate population of a pleasant capital city. Detroit and Omaha each ceased to know any loss of prestige from the transfer of the State capitals to other localities, in the prodigious forces they wield in manufactures and traffic.

A very curious phenomenon must not be omitted in this generalization of the older West. I spoke of population massing where transfers must take place. In the Ohio river is a fall, or rapid, where, within the space of two miles, the level changes about twenty feet. In the spring floods, boats pass in the river channel; but in the summer drought traffic was impeded until the government cut a channel through the solid rock around the obstruction. This led to the grouping of a large population about the falls of the Ohio. The greater part of it is out of the special boundaries treated in this volume; but the cities of Louisville, Kentucky, and of Jeffersonville and New Albany, Indiana—separate as they are in municipal relations, and parted into two State jurisdictions—in a grand view of the laws of population, make but a unit, and that gathered about the break in the Ohio river navigation. Jeffersonville is above the rapids; New Albany is below. The main business part of Louisville is above the falls connected by street cars with the foot of the canal.

In 1849, the glittering mineral wealth of the Pacific coast drew men thither in multitudes. The coast is forbidding. Dana's

"Two Years before the Mast" shows what the California coast was under Mexican occupation. Ships almost everywhere must then lie off shore, and take their scanty loading by small boats from the land. At only a few points was there a claim of shelter in storms. The captains watched the weather indications, and put to sea for room to meet winds in safety. On that rugged and forbidding coast the water-courses and natural forces had made one grand opening. No wonder that the navigator, wearily looking in vain for a safe inlet for hundreds of miles, was ready to give the broad passage that opened into a land-locked bay large enough to hold all the fleets of the world, the beautiful and expressive name of the Golden Gate. Gold did not locate that harbor: it only quickened the selection which must have come in the future had the slow processes of ordinary migration been left to work. Here population must mass itself; and, in the philosophy of population, San Francisco and Oakland count but as one, divided though they may be in mere local interest. Similar reasons, less conspicuous, will make a city near the mouth of the Columbia.

The question of predominance with our inland cities is a question of preference in through commerce, bearing the teas and spices and silks of Asia and of Pacific islands, swollen by the way traffic of our own rich mines, of our own fertile fields, of our own busy factories, and by the fabrication of the articles of wear and of use. All this gives special force to the extension of the railroad systems which I have barely named hitherto in this chapter, but which now represent the greatest energy of the century. The share of Chicago, or of St. Louis, of Cincinnati, of Toledo, or of Cleveland, of Omaha, of St. Joseph, of Leavenworth, or of Kansas City, of yet other localities along the way across the continent, in this traffic and in this supply, will be the story of their relative greatness.

Natural causes have done much to fix the predominant traffic of the country on the Atlantic side at New York, which needs the addition of Brooklyn, Jersey City, and all those minor municipalities that are simply separated by narrow water-courses, to show how commerce has massed the people there. On the Pacific side, San Francisco is even more absolutely made predominant. We must not forget, that, in the olden time, injustice and extortion turned the course of traffic out of its natural channels, and just weights and true measures in financial trans-

actions will again have a determining value in the life of communities.

In the extension of migration, an impetus was given to cities where the east and west traffic crossed the great rivers; as bridges were not built at first. Minneapolis, at the head of navigation on the Mississippi—now, in the new economy of railroads, seldom visited by steamboats; St. Paul, Winona, La Crosse, Dubuque, Clinton—really but a unit in population with Lyons and with Fulton; Davenport, with Rock Island and Moline contiguous; Burlington, Quincy, Hannibal, Alton, St. Louis—each was modified by the business made by the check to travel by the crossing current; as also, Sioux City, Council Bluffs, and Omaha, Leavenworth, St. Joseph, and Kansas City, along the Missouri.

These generalizations of causes that determine the location of cities are justified in most cases by the growth of western cities. Peculiar causes have operated in some instances, which demand notice. Salt Lake City is the product of that strange religious economy known as Mormonism. Many look little deeper into it than to know of the offensive polygamy with which it is identified and the spiritual despotism which is attributed to it. This is a partial view. The despotism that one man would exercise over another, will not be sustained unless wielded with a shrewd discretion, for a well-devised end, that makes its subjects, on the whole, willing ones. The Mormons had made themselves obnoxious in Ohio, in Missouri, in Illinois, in Iowa. They withdrew, as they supposed, from the reach of ordinary civilization. They took a desert mountain basin, where by patient labor and by irrigation they have supported themselves, built up a strong community, and furnished surplus products beyond the consumption of their own immigrants. The growth of Salt Lake City and of the Mormon community is too recent for one properly to analyze its history. It yet remains to be seen, whether by the death of some individuals, and the pressure of events, it will pass away in a few years, or whether it will prove that the adventurous Joseph Smith waked a responsive feeling among religiously inclined ignorant people that will produce a permanent religion with its special social economies.

A few cities have been built up in mountainous regions by the wealth of neighboring mines and their use as health resorts.

I shall now proceed to notice, with more of detail, the predominant characteristics of the larger cities, with some suggestions as to the resources and the peculiarities of the smaller ones. First, come the great grain interests. In 1879, Chicago received nearly thirty-five million bushels of wheat; St. Louis, over seventeen million bushels; Toledo, over eighteen million bushels; Detroit, over twelve millions; Milwaukee, over nineteen million bushels; Kansas City, six and one-half million bushels. Of all kinds of grain, Indianapolis received thirty-five million bushels; and Peoria, nearly twenty million bushels: and of corn, the city of Chicago received nearly sixty-five million bushels; the city of Toledo, over fifteen and one-half million bushels; the city of St. Louis, nearly fourteen million bushels; the city of Peoria, nearly ten and one-half million bushels; and Kansas City, over four million one hundred thousand bushels. Below, I have compiled a table which gives in bushels the outline of the grain trade of ten of the great Western cities:

Milwaukee	38,886,940	Toledo	44,745,807
Indianapolis	34,918,906	St. Louis	48,087,578
Peoria	19,080,215	Detroit*	13,042,406
Omaha	4,000,000	Minneapolis (about)	9,000,000
Kansas City	11,093,963		
Chicago	125,536,379	Total	345,290,494

In the case of Detroit, only wheat could be obtained; so that it is safe to add to the total of over three hundred and forty-five million bushels, ten million bushels at least for the grain other than wheat shipped to Detroit; and, estimating the shipments to St. Paul (a city from which I was unable to obtain definite data) at four million bushels, gives a total of three hundred and sixty million bushels of grain received during that year in these railroad centres of the West. Such figures give an idea of the magnitude of the grain transactions. The pork packing interests of one of these States amount to a grand total of five million hogs, out of some seven and one-half millions packed in the Mississippi valley.

Direct correspondence has been held with officials or other prominent citizens in every city, for this work. I have derived important aid from the careful reviews of local commerce and manufactures in Bradstreet's. The trade reports of such cities as publish them, have been carefully examined; yet, unfortunately, at this writing it is impossible to give the exact figures in

* Wheat only.

relation to the industries of these cities. This class of statistics has been collected with unusual care for the Census of 1880, by the aid of experts and special agents, and the results, when fully published, will be of a more satisfactory character than former estimates. As nearly as I can ascertain, the following table shows the number of establishments, number of hands employed, capital invested, amount paid in wages, value of material used, and value of the manufactures of the cities named.

Items.	1850.			1880.		
	Ten Prairie States.	Pacific States and Territories.	Totals.	Ten Prairie States.	Pacific States and Territories.	Totals.
Establishments	24,021	* 1,039	25,060	39,325	* 3,977	43,302
Operatives	110,501	4,000	114,501	189,261	51,493	240,754
Capital	$ 82,000,000	$ 1,994,197	$ 84,701,197	$178,055,264	$55,113,870	$233,169,134
Wages	33,014,140	4,113,764	34,128,144	77,222,222	23,733,845	97,976,073
Material	70,737,897	2,500,035	73,237,932	204,222,254	39,485,170	243,707,424
Product	140,000,000	15,000,000	155,000,000	340,000,000	75,000,000	415,000,000

Items.	1870.			1880.		
	Ten Prairie States.	Pacific States and Territories.	Totals.	Ten Prairie States.	Pacific States and Territories.	Totals.
Establishments	68,039	4,710	72,749	194,782	10,048	204,811
Operatives	497,922	24,218	522,140	703,228	97,480	812,708
Capital	$ 526,128,720	$ 27,009,216	$ 553,137,936	$ 938,222,278	$103,213,197	$ 961,435,475
Wages	179,133,217	13,151,760	192,284,977	271,222,244	22,027,499	293,249,743
Material	627,223,211	25,207,722	652,431,033	1,077,222,240	81,797,273	1,157,019,513
Product	1,072,222,222	102,000,000	1,174,222,270	1,819,222,222	177,477,213	1,997,222,722

The above table has been prepared with the greatest possible care; and, in cases where the exact figures for 1880 could not be obtained, estimates have been substituted. In the preparation of these estimates, to avoid extravagant statements, and to be sure of making the calculations under, rather than above, the actual results, the age of the State, and the growth of such industries as iron, glass, and so on, where exact figures are obtainable, have been taken into consideration, and, indeed, all other elements that have a bearing upon the increase or the decrease of manufactures. Should the figures prove approximately correct, as I am inclined to think they will, the increase in the number of manufacturing establishments in the ten Prairie States in thirty years would be nearly one hundred thousand; the increase in the number of hands employed, nearly six hundred and fifty thousand; in capital, nearly eight hundred

* Oregon, California, and Utah only.

million dollars; in product, over $1,670,000,000. Even in the Pacific States and Territories, there will have been an increase in establishments of nearly ten thousand, of fifty-three thousand in the number of the operatives, of very nearly one hundred million dollars in capital, and of not less than $102,000,000 in products. Actual figures, as will be shown farther along, in all the large industrial centres of the West for the past ten years, tend to show that this great general increase will be more rather than less than the estimate. The figures of 1850, 1860, and 1870, may be regarded as absolutely correct; while those of 1880 will undoubtedly be subject to some revision. The calculation which I have in the following table thought advisable to introduce into the chapter on cities, has been made with great pains, and, of course, in the case of 1850, 1860, and 1870, with the absolute returns of the Census as a basis. In 1880 the returns are in a measure imperfect, and in some States are only from some of the larger cities. The table shows the per cent. of increase and decrease of manufactures for the last three decades. Owing to the massing of capital and the increase of large manufacturing corporations, the percentage of growth in number of establishments would be of no value in such a calculation. The amount of wages paid, and the material used, were, for apparent reasons, excluded, and the three principal elements in industrial progress—viz., the number of hands employed, the amount of capital, and the value of the product—were alone taken into consideration. The few instances where a decrease is noted for the decade ending in 1880, must be attributed to the imperfections of the returns rather than to the falling off of industrial energies.

The following shows the per cent. of increase and decrease of manufactures in the ten Prairie States for the years given:

States.	1880 to 1885.			1860 to 1870.			1870 to 1880.		
	Hands.	Capital.	Prod'ct.	Hands.	Capital.	Prod'ct.	Hands.	Capital.	Prod'ct.
Illinois	98	948	948	861	948	897	64	97	88
Indiana	47	128	128	178	198	128	15	48	72
Iowa	849	688	888	897	898	898	89	49	49
Kansas				894	898	170	181	189	898
Michigan	148	898	188	178	897	898	88	74	49
Minnesota	8,870	8,440	898	481	470	898	818	189	898
Missouri	94	198	78	898	898	898	89	48	48
Nebraska				898	714	844	778	898	898
Ohio	47	87	94	81	148	181	88	88	78
Wisconsin	198	848	800	289	198	177	80	88	88

The following shows the per cent. of increase and decrease of manufactures in the Pacific States and Territories for the years specified:

States and Territories.	1850 to 1860.			1860 to 1870.			1870 to 1880.		
	Hands.	Capital.	Prod'ct.	Hands.	Capital.	Prod'ct.	Hands.	Capital.	Prod'ct.
California	1,142	2,000	322	49*	30	9*	50	60	85
Colorado							90	105	112
Nevada							68	94	105
Oregon	243	95	85	195	227	181	110	125	94
Arizona							33	44	46
Dakota							455	441	809
Idaho							65	32*	10*
Montana							49*	75*	84*
Utah	622	605	209	294	214	180	110	104	93
Washington				18	46	168	90	50	115
Wyoming							15	40	70

To sum up the somewhat elaborate statement above given, and in order to show the relative per cent. of increase in industrial effort in the United States, and in the ten Prairie States and Territories for the last thirty years, the following brief comparison between the United States and the Western States and Territories will be interesting:

States.	1850 to 1860.			1860 to 1870.			1870 to 1880.		
	Hands.	Capital.	Prod'ct.	Hands.	Capital.	Prod'ct.	Hands.	Capital.	Prod'ct.
United States	37	90	85	56	109	124	65	80	90
Western States & Ter's.	100†	207†	159†	120†	191†	179†	88	65	70

In 1850, for which year these facts may be relied upon, the Western States and Territories boasted of twelve per cent. of the number of hands employed in the manufactures of the United States, twelve per cent. of the capital, and about sixteen per cent. of the products. Ten years later, they had eighteen per cent. of the hands, eighteen per cent. of the capital, and twenty-two per cent. of the products. In 1870, they had increased to twenty-six per cent. of the hands, twenty-seven per cent. of the capital, and twenty-eight per cent. of the product. It would be impossible to estimate, without the absolute returns, what the per cent. is now; but it has probably increased to thirty per cent., and most likely to thirty-five per cent., of the entire manufacturing product of the United States.

* Decrease.

† Increase of Pacific States and Territories from 1870 to 1880, is in California, Oregon, and Utah.

In Ohio, manufactures of wool and of agricultural implements may be said to be prominent in all her interior cities. Cincinnati stands without a rival in the State. Up to 1816 scarcely more than a village, it had been from its founding, in 1789, the point around which centred the enterprises of the expanding West. From this point expeditions set forth against hostile Indians in the Northwest. Here sturdy settlers had a headquarters whence to turn up the Miami to the northern country, or to follow the Licking into the hunting grounds of Kentucky. It rapidly assimilated to itself the modern improvements, canal, railroad, telegraph, and was undisputed Queen of the West till the great outpouring of migration by the lake routes. In the commerce of Southern and Western products, it long held the lead, and now, although the centre of agricultural supplies has passed further westward, it still maintains high commercial rank, and is continually growing in wealth.

A large proportion of its people are Germans, transplanting their native love of music. Beautiful fountains, fine halls, are among the more public evidences of cultivated taste; while in painting and sculpture, and particularly in decorative carving and ceramic painting, Cincinnati is probably without a rival in the United States. Its public works show the mature solidity of well-established wealth. Libraries and societies, historical, philosophical, horticultural, literary—of various aim and degree—thrive as in no other city of the West. A wine growers' association springs from a peculiar product of the adjacent hills. Steam ferries and fine bridges connect it with the Kentucky shore. Eighteen railroads pay their tribute to its greatness, some of them radiating away into the extreme south for the snowy cotton, in which Cincinnati bids fair to have a very large commerce. Pork is still the leading export. Iron, metal, wooden wares, tobacco, whisky, and beer, boots, shoes, carriages, and furniture, are her chief manufactures.

According to the eleventh annual and twelfth statistical report of the Cincinnati Board of Trade for the year ending June 1, 1880, the aggregate cash capital invested, and the value of real estate occupied, in producing all classes of manufactures in Cincinnati, is shown below. The same report undertakes to give a comparative statement of the aggregate number of hands employed in producing each class of articles manufactured in Cincinnati, and the value of the results.

Years.	Cash Capital	Value Real Estate Occupied.	Number of Hands.	Value Products.
1877	$61,883,787	$51,550,996	60,723	$140,583,960
1878	57,868,592	47,464,792	64,709	135,113,768
1879	57,509,315	45,945,637	67,145	138,796,165
1880	60,523,850	48,111,870	74,798	148,957,980

The following is a comparative and classified statement of the number of hands employed in the manufacturing industries in Cincinnati for the years 1840, 1850, 1860, 1870, 1874, 1875, 1876, 1877, 1878, and 1879, taken from page 52 of the Eleventh Annual Report of the Board of Trade and Transportation:

Classification.	1840.	1850.	1860.	1870.	1874.	1875.	1876.	1877.	1878.	1879.
Iron	1,320	6,075	5,835	10,778	8,713	6,833	7,341	7,326	7,720	8,805
Other metals	400	921	776	1,888	2,147	2,154	2,913	2,594	2,871	2,998
Wood	1,400	3,793	4,343	7,497	7,477	6,024	7,788	5,699	6,479	9,420
Leather	900	2,473	2,950	4,647	4,243	3,448	5,402	5,053	6,944	7,098
Food	1,567	3,961	787	3,284	4,907	4,220	4,631	4,926	4,420	5,012
Soaps, candles and oils	140	710	800	1,132	1,043	1,057	1,156	1,071	1,150	1,209
Clothing	1,317	3,128	10,401	12,200	13,126	13,022	15,128	16,904	16,511	18,858
Liquors	110	803	1,000	2,201	1,933	1,816	1,772	1,841	1,889	1,904
Cotton, wool, hemp, etc	350	600	600	1,000	850	944	1,050	1,272	1,097	1,393
Drugs, chemicals, etc	114	394	410	770	590	621	611	694	697	743
Stone and earth	301	541	960	2,000	2,199	2,151	2,075	2,225	2,014	2,413
Carriages, cars, etc	97	400	700	1,170	1,200	1,200	1,483	1,200	2,000	2,152
Paper, etc	512	1,075	1,000	1,400	1,000	921	921	900	1,075	1,647
Book binding & blank books			101	241	225	225	280	519	500	606
Printing and publishing			1,040	2,500	2,254	2,200	2,400	2,516	2,727	2,973
Tobacco			500	3,000	3,000	3,000	3,250	3,400	3,981	4,100
Fine arts	130	200	150	200	225	207	254	340	370	436
Miscellaneous	449	2,200	2,546	4,177	1,900	2,104	2,311	2,461	2,266	2,711
Totals	9,040	28,567	34,109	58,227	60,052	58,126	60,726	64,771	67,145	73,798

The next table is a similar statement of the value of the products of the manufacturing industries in Cincinnati for the same years:

Classification.	1840.	1850.	1860.	1870.
Iron	$1,723,504	$4,145,376	$5,370,000	$20,804,268
Other metals	468,040	1,426,190	1,464,726	5,272,456
Wood	2,088,227	4,140,000	5,000,188	12,000,165
Leather	1,088,750	2,875,150	2,000,324	7,227,324
Food	4,000,617	14,775,000	17,000,000	27,000,621
Soaps, candles and oils	625,940	1,048,000	3,000,000	7,425,561
Clothing	2,000,000	4,000,000	4,727,000	11,000,000
Liquors	527,500	2,500,000	4,000,321	10,261,004
Cotton, wool, hemp, etc	411,120	1,121,000	724,000	1,824,774
Drugs, chemicals, etc	458,250	2,015,000	1,000,000	3,542,125
Stone and earth	200,000	713,000	900,000	2,000,162
Carriages, cars, etc	117,000	507,447	725,125	1,724,413
Paper, etc	600,000	1,000,000	900,000	2,000,519
Book-binding and blank books			121,170	600,370
Printing and publishing			1,000,101	4,000,000
Tobacco			615,000	1,027,000
Fine arts	110,000	84,000	100,000	240,744
Miscellaneous	700,000	2,347,000	2,000,000	5,000,000
Totals	$15,000,000	$46,000,000	$50,000,000	$127,000,000

CLASSIFICATION.	1876.	1877.	1878.	1879.
Iron	$13,142,981	$13,395,749	$14,020,400	$14,919,925
Other metals	4,251,214	4,491,020	4,742,794	5,000,000
Wood	12,990,718	13,077,004	13,940,694	13,971,111
Leather	7,726,815	7,858,089	8,038,075	8,234,500
Food	27,941,527	29,710,098	30,082,181	30,000,000
Soaps, candles, and oils	9,964,100	9,883,930	9,000,497	9,000,000
Clothing	12,931,010	13,250,010	11,000,000	12,000,000
Liquors	23,615,566	23,617,711	24,031,726	24,027,149
Cotton, wool, hemp, etc.	1,288,190	1,270,587	1,418,400	1,000,000
Drugs, chemicals, etc	3,770,040	4,125,448	4,031,700	4,031,000
Stone and earth	2,440,000	2,194,513	2,000,007	2,100,000
Carriages, cars, etc	1,040,707	2,054,004	2,000,749	2,000,000
Paper	2,167,113	2,160,483	2,000,447	2,000,000
Book-binding and blank books	700,000	600,700	670,000	700,000
Printing and publishing	3,415,140	4,000,000	4,000,000	4,000,000
Tobacco	4,000,000	4,315,731	4,271,027	4,000,000
Fine arts	317,070	333,120	370,670	370,000
Miscellaneous	4,000,000	4,250,111	4,007,145	4,000,000
Totals	$140,824,960	$135,138,788	$135,700,135	$140,357,285

These two exhibits, while they do not reach the value of the more exact and carefully prepared statement of the Census office, show, at least approximately, the increase of the number of operatives employed in the manufactures of the city, and of the value of the products.

The report of the Cincinnati Board of Trade and Transportation for the year to March 1, 1881, enables us to add some further comparative figures:*

PRODUCTS.	1880.	1880.
Total value manufactured articles		$170,351,497
Clothing	$7,000,000+	18,750,000
Carriages	750,000	6,500,000
Wood products	6,000,000	14,000,000
Leather	8,000,000	11,000,000
Distilled liquors	818,660	10,321,000
Malt liquors	981,397	4,740,000

Following are some additional items from the same report:

Boot and shoe manufactories	271
Tobacco, cigar, and cigarette factories	481
Clothing manufactories	290
Bakeries	273
Total manufactories	5,450
Hands employed	80,630
Cash capital and real estate invested	$107,731,010

The Cincinnati district paid an internal revenue tax, for the year ending June 30, 1880, amounting to nearly one-eleventh of that paid in the United States, as follows:†

* Bradstreet's, April 23, 1881. † Id., July 23, 1880.

Distilled spirits	$9,389,426
Tobacco, cigars, snuff, etc.	1,336,916
Fermented liquors	603,669
Banks and bankers	26,915
Miscellaneous	845
Penalties	7,040
Total	$11,356,841

In 1878, the product of the manufactures of the three cities of St. Louis, Cincinnati, and Louisville, was $418,000,000, almost equal to the total value of importations to the United States.

Cleveland, with the best harbor on Lake Erie, has been celebrated for the beauty of its streets. Its commercial importance arises, in large degree, from the fact that many iron ores require a mixture of ore different in its chemical combinations to make them less refractory, united with the convenience of its location as a distributing point for the Lake Superior iron ores. It is estimated that nine-tenths of the Lake Superior iron ore product is sold at Cleveland, supplying furnaces in Pennsylvania and West Virginia, Michigan and Illinois, as well as in Ohio.* In the season of 1880, 1,658,308 tons of iron ore were shipped from the Lake Superior ports.

For the year to November, 1879, the manufactured products of Cleveland were:

Pig iron smelted from stone coal, tons	60,000
Bar and sheet iron, tons	50,350
Boiler iron, tons	8,915
Stove castings, tons	10,000
Car wheels and car castings, tons	15,000
Iron railroad rails, tons	30,000
Steel railroad rails, tons	78,900
Locomotives	15
Steam engines	100
Steam boilers	220
Sewing machines	73,000
Steamboats (Lake Erie—value, $275,000)	3
Lime, bbls.	73,574
Refined petroleum, bbls.	2,000,000
Pork, packed, bbls.	319,480
Flour, bbls.	300,000
Ale and beer, bbls.	18,000
Paper, tons	5,000
White lead, paints and colors, tons	6,000
Crude petroleum used, bbls.	2,275,000

A great coal trade converges at Cleveland, and the refining of petroleum is an important industry. In 1873, the capital in petroleum refineries was $2,600,000, using 2,000,000 barrels crude oil, and producing 1,500,000 barrels refined oil, at a value of $12,000,000. The present movement of capital into manu-

* Bradstreet's, Nov. 1, 1880.

facturing ventures is said to exceed anything in the previous history of the city.

Cleveland is the third city in summer pork-packing. In the year to April 12, 1880, the receipts of coal were 1,233,465 tons bituminous, and 60,268 tons anthracite; while the shipments were 284,051 tons bituminous and 15,821 tons anthracite.

Toledo reaches into the magnificent forests of Northern Indiana and of Michigan, and has the most extended wagon works in the country, with other large manufactories. Its grain trade is vast, its system of railroads reaching direct into the grain fields of the far West. It is a prominent lumber market; its eleven elevators hold 4,175,000 bushels; and thirteen railroads come to its wharves. *The grain received at Toledo, in 1878, was 44,748,897 bushels. The coal receipts were about 400,000 tons; receipts of lumber, about 190,000,000 feet; of timber, a little over a million feet; of iron, nearly 23,500 tons; nearly 8,000 tons of ore; and over 400,000 units of salt, undesignated, mostly Michigan salt. Transportation of these is so much the business of Toledo that manufactures are not tabulated in the report to which I am indebted for the above figures.

Columbus, on the Scioto, was selected as the capital in 1812. Its wealth of superior coal, the abundant supply of valuable timber, its political relation to the State, and its central position, have brought important railroad facilities to its aid, so that it has a great wholesale trade, in addition to its miscellaneous manufactures. Carriages and buggies alone were reported sold last year to the value of over a million dollars.†

Sandusky, on Lake Erie, claims to be the greatest fresh-fish market in the world. The average daily shipments for the year, to November, 1879, were 175 barrels. A capital of over $250,000 is invested, and over 1,000 men are employed. The sales were estimated at $300,000 to $350,000 for the season of 1879. Lime is furnished in great quantities, the estimated sales of 1879 being 150,000 barrels. About a million gallons of wine were produced in the vicinity in the same year. The Baltimore & Ohio Railroad discharges an immense amount of coal here for the Northern Lakes.

Ohio possesses a large number of cities of moderate size, similar in energy, activity, and prosperity, varying in detail of local advantage or interest. Along the Ohio river are Steuben-

* Twentieth Annual Report Trade of Toledo. † Bradstreet's, Nov. 10, 1880.

ville and Bellaire, with their wealth of coal, and opportunities for great iron works; Portsmouth and Ironton, rich in their surroundings of iron ore and iron industries.

Akron, a little south of Cleveland, and Tiffin, seat of Heidelberg College, have potteries prominent in their miscellaneous manufactures, and extensive tile works. Canton, Youngstown, and Newark are noted for their coal and iron products, as is Dayton for its water-power, and fine limestone quarries. Hamilton, Lima, Mansfield, Springfield, all are active with their manufactures, the latter employing 4,000 men. Chillicothe, capital from 1800 to 1810, makes a specialty of steam engines, and has the rare distinction of no debt. Indian reminiscences cluster about it to interest the antiquarian. Zanesville, the capital from 1810 to 1812, is accessible by light-draft steamers on the Muskingum, and is rich in coal and in iron ore. The agricultural machinery made in the inland towns of Ohio is celebrated all over the West.

Indiana—only touched by immigration along its border till railroads pushed into it—has twelve cities in the table.

In Indianapolis, the capital, on the White river, near the geographical centre of the State, thirteen railroads bring their trains into a single union depot. The city is in the middle of the great corn belt; and the coal fields are of ready access. The Indianapolis stock yards are claimed to be second only to those of Chicago in receipts of sheep, and third in receipts of horses and of hogs. The receipts in 1879, were 111,927 sheep, 1,123,409 hogs, 9,358 horses. The consumption of coal is estimated at 400,000 tons annually.

The following shows the prominent receipts for 1879:

Flour, bbls	1,426,000	Cotton, bales	261,200
Wheat, bu.	8,802,708	Coal and coke, tons	506,925
Corn, bu.	14,490,779	Hides, tons	12,000
Oats, bu.	8,281,060	Ice, tons	12,200
Rye, bu.	586,250	Lumber, feet	104,587,000
Barley, bu.	628,109	Salt, bbls.	100,940
Total, (bbls. reduced to bu.)	34,918,906	Hogs, packed, about	660,000

Evansville is at head of low-water navigation on the Ohio, and is advantageously situated for reaching into Kentucky and Tennessee and Illinois by navigable branches of the Ohio. It was the terminus of the Wabash and Erie Canal. The city has made very large municipal subscriptions to railroad enterprises. In 1879, there were 254 mills and other manufacturing establish-

ments, with $3,330,955 capital, and a production of the annual value of $5,497,727. Jeffersonville, at the head of the Falls of the Ohio, has car and machine shops, and is the location of the Southern Indiana penitentiary. New Albany, just below the Falls of the Ohio, has a great water-power and great manufacturing interests. Lafayette, on the Wabash river, has extended manufactures and an active wholesale trade. The manufacture of wooden pumps is a leading industry, and more boots and shoes* are made here than in all the rest of the State. Vincennes was identified with the French occupation as Post St. Vincent's; and around it cluster many historic events in the development of the country.

Ft. Wayne marks a spot of importance in the days of early settlement. It retains the old name, but is now a rapidly growing city, busy with manufactures and commerce, in a rich district. Logansport has fine timber and stone adjacent. Madison, on the Ohio, has a large packing and provision trade. Richmond is picturesque and of marked healthiness, with over fifteen hundred hands in its manufactories. South Bend, near the hard woods of Northern Indiana and Michigan, is prominent in the manufacture of wagons and of carriages, with excellent water-power from the St. Joseph river. Terre Haute, with rich country and superior coal beds about it, with extended manufactures, the seat of the State Normal school, and with a community proud of the beauty of its streets and its fine residences, rounds out a grand list for a State rejected by many of the earlier western emigrants on account of its mud and ague.

I have already referred to some points in the growth of Chicago, chief of the twenty-two cities we notice in Illinois. But how shall any adequate conception of its growth and its forces be concentrated into a few sentences, or into language at all! The point of disembarking for voyagers to the head of the lake; known chiefly in 1812 for the massacre of its garrison by the Indians; only a trading post and an Indian agency in 1820; when travel by the lakes began to quicken, its swamps were filled, its little river was dug into the semblance of a harbor, and railroads vied with each other to reach it. Not one dollar has Chicago as a city invested in any railroad; but she has added not less than eight feet to the level of the old swamps, where she raises her great structures; has dug out

* Bradstreet's, March 8, 1880.

channels for vessels; and has now almost bridges enough to make her an American Venice.

The value of harbors in settling the question of the location of cities has been discussed above. The following document* shows how these indications of the future importance of Chicago were recognized at an early day.

MARCH 1, 1833.

To Brig. Gen. C. Gratiot, Chief Engineer.

SIR: In obedience to your orders, I have the honor to submit the following report on a proposed harbor at the mouth of Chicago river, on Lake Michigan, with an estimate of the expense of constructing the same. * * *

Chicago, which, from its situation, is destined to become a place of considerable importance, is now composed, exclusive of Fort Dearborn, of about a dozen houses, scattered about on both sides of the creek or river of the same name. It is about thirty-five miles from the southern extremity of Lake Michigan, and is the point selected for the eastern termination of the Michigan and Illinois Canal. It is the only situation, for a long extent of the shore of the lake, which offers facilities for the construction of a good harbor; and is perhaps the only situation, with the exception of the mouth of St. Joseph's, which is on the eastern shore, where such a work can be advantageously made, on the whole southern portion of the lake. At present, the vessels which navigate Lake Michigan are exposed to all the vicissitudes of the weather, without the possibility of procuring any shelter to the southward of the Manitou islands, except indeed occasionally, but very rarely, when the St. Joseph river has been strong enough to remove the bar at its mouth. This navigation is already of sufficient interest to warrant an exertion to afford it protection; but when we consider the great extent of fertile land lately acquired by the government, to which Chicago must form the entrance from the East, it is plain that its importance must, in a very few years, be many times multiplied; the more especially, on account of the facility which the canal, when made, will afford to the ingress of settlers to the government lands.

Half a century ago Chicago consisted of a dozen houses scattered about on the creek of the same name. To-day it has half a million of inhabitants; is one of the busiest cities in existence, and is the greatest grain market in the world. It is the head of the lumber trade of the United States; stands before all other cities in the pork trade, and is unequaled in railroad facilities. Its rapid industrial development is illustrated by the following statistics for Cook county:

ITEMS.	1860.	1870.	1880.
Total number of establishments	469	1,440	3,752
Hands employed	5,598	31,105	113,507
Wages	$ 1,992,267	$13,045,266	$ 37,615,381
Annual value of products	13,555,671	92,518,749	253,405,695

* Extract from a letter of the Secretary of War, to the House of Representatives, dated March 1, 1833, transmitting an estimate for the improving of the harbor of Chicago.—*See Ex. Doc. 69, First Sess. Twenty-first Cong.*

In 1860, there were, according to the Census, 460 manufacturing establishments in Cook county, Illinois. Another decade had increased the number over 300 per cent.; and during the last decennial period the increase has exceeded 260 per cent. The hands engaged in this class of work increased in ten years from about 5,500 to 31,000; and now they exceed 100,000—an increase during the first decade of nearly 600 per cent., and in the second of over 300 per cent. The wages paid, from about $2,000,000, show an increase of upward of $11,000,000 the first decade, and of nearly $25,000,000 the second decade; and the value of the products rose from $13,500,000 in 1860, to $92,500,000 in 1870; and to over $250,000,000 in 1880. Was ever such a rapid rate of material progress known elsewhere in the history of the world?

The North Chicago Rolling Mill Company, of which Orrin W. Potter is President, made at their works in the fiscal year ending July 1, 1880, 377,184 tons of iron and steel, their gross receipts being $9,172,523.14; and for the year to July 1, 1881, the product was 470,248 tons, and gross receipts, $12,297,426.55. Even this great type of Chicago energy is to be expanded to a capacity of 350,000 tons pig metal, 240,000 tons steel rails, 100,000 tons iron rails, and 50,000 tons bar iron. All this stupendous vigor is shown in a city that, so lately as 1871, was laid waste by the most destructive fire in history, sweeping away 75,000 houses, and making 100,000 people, a third of the population, homeless, besides obliterating the business part of the city.

The value of the farm products shipped from this city during 1879 was estimated by Charles Randolph, Secretary of the Board of Trade and Commerce, in his twenty-second annual report, as follows:

Flour and grain (equal to 125,526,879 bushels)	$78,452,000
Live stock	51,500,000
Meats, lard, tallow, and dressed hogs	73,500,000
Butter and cheese	11,800,000
Wool and hides	23,000,000
Seeds and broom corn	5,400,000
Highwines and alcohol	4,500,000
Miscellaneous products	5,000,000
A grand total of	$253,152,000
Corresponding estimate for 1878	$207,400,000
Corresponding estimate for 1877	218,400,000
Corresponding estimate for 1876	281,450,000
Corresponding estimate for 1875	215,800,000

According to Mr. George T. Williams, Secretary of the Union Stock Yards and Transit Company, the receipts of live stock at those yards, and its valuation for the past five years, have been as follows:

YEARS.	No. Cattle.	No. Hogs.	No. Sheep.	No. Horses.	Total Value.
1880	1,389,897	7,059,194	535,810	10,881	.....
1879	1,215,723	6,448,880	395,119	10,473	$114,795,834
1878	1,083,068	5,320,654	310,430	9,415	106,101,879
1877	1,088,151	4,026,970	310,940	7,874	99,094,100
1876	1,096,745	4,190,006	364,095	8,189	111,185,630
1875	930,843	3,912,110	418,945	11,346	117,583,943

In the packing of pork, Chicago still retains its prominence, the packing of the calendar year 1879 being 4,800,000 hogs, and for 1880, about 5,600,000. The value of dairy products has also increased, the receipts of butter being 54,623,222 pounds; receipts of butter for 1880, 67,635,856 pounds; and of cheese, in 1879, 32,590,519 pounds: an additional quantity, especially of butter, has been received by express, of which no correct record is kept.

The aggregate receipts of lumber for the year 1879 were largely in excess of any previous year, aggregating nearly one and one-half billion feet, and in 1880 were a hundred million feet above receipts of 1879.

The shipments of produce from Chicago are constantly increasing, in 1879 reaching 768,153 tons, consisting mainly of grain, flour, meal, and provisions. The value of these commodities could not have been less than forty-five million dollars.

Springfield, in the prairies of Illinois, adds watch making, iron rolling, and coal mining, to its prestige as capital of the State.

Aurora, on Fox river, is beautiful of situation, has car shops with fifteen hundred men working in them, a silver plate manufactory, flouring and grist mills, and other factories. Elgin, on the same river, has a watch factory, the second in size in the Union, and one of the State Insane Asylums. It is prominent in dairy interests, and sustains a regular Board of Trade.* The dairy products of Elgin for six months in 1880, were 4,311,483 pounds of cheese, and 1,274,803 pounds of butter, amounting in value to $804,363. The estimated cost of dairy utensils and implements for the year was $3,000,000. This region has about one hundred and twenty-five butter and cheese factories.

* Ed. Beacon.

Belleville is a few miles east of St. Louis. Its population is mainly German. It is in the midst of the most productive coal beds of the State; has large iron works, including one of the largest rolling mills of the West; and contains woolen mills, flouring and grist mills, and other important industries. Bloomington, with car shops and a phenomenal supply of water from a gravel vein, is built on a high rolling central prairie in the midst of the agricultural wealth of the State, and in trade and manufactures does a business of $20,000,000 per annum. Cairo, surveyed, as the early speculators told the story, by men in boats and with long poles, is now diked all around to keep out the Ohio and the Mississippi, at whose confluence the city stands. It has factories and a large local and river trade. Over 4,000 steamboats land at its wharves annually. Decatur, almost at the geographical centre of the State, with rolling mills and factories, has only $85,000 bonded debt. Danville, in the east of the State, a prairie city of active work in its car shops—without any bonded debt—has twenty-three factories. The body of the people at East St. Louis, are on these river bottom lands to transfer commerce at the Mississippi. Freeport, on the Pecatonica, has a grape sugar factory among its activities. Galesburg is noted as a community transplanted, church, college, and all, equipped, from Central New York. It has coal convenient, and car shops. Jacksonville bears the name of the "Athens of the West," for its group of colleges, seminaries, benevolent institutions, and literary societies. Joliet, on the Des Plaines, with good water-power, and coal fields but a few miles off, has great iron and steel mills, and is rich in magnificent quarries. Ottawa, at the junction of the Fox and the Illinois, possesses a magnificent water-power, artesian wells, good coal, excellent sand for glass works, which are increasing in importance, and its starch is known everywhere. La Salle, lower on the Illinois, with yet more coal, with the largest zinc smelting works in the country, drawing their ore from Galena, puts up immense quantities of ice for the South, and manufactures hydraulic cement and glass.

Peoria, yet lower on the Illinois, has great manufacturing and trade interests, in which distilling and stove-casting are prominent. The increase in the distillation of highwines and alcohol in Peoria may be seen from the following carefully prepared table:

Years.	Grain Used, Bushels.	Spirits Produced, Gallons.	Yield per Bushel, Gallons.
1869	1,097,317	3,875,077	3.53
1870	1,231,600	4,319,116	3.51
1871	1,294,559	4,765,580	3.68
1872	1,642,725	5,966,439	3.63
1873	1,790,473	6,416,782	3.58
1874	2,083,966	7,218,985	3.55
1875	1,835,081	6,854,181	3.73
1876	2,539,735	9,450,499	3.73
1877	1,966,738	7,645,175	3.88
1878	3,001,808	11,520,360	3.84
1879	3,868,918	15,052,960	3.88
Totals	22,313,559	83,065,079	3.69

No less than 1,584,856,000 pounds of freight was received by railroad and rivers for the year 1879, and 1,184,684,000 shipped. The aggregate receipts of grain, including flour, for 1879, were 19,080,215 bushels. Corn is the principal item in the grain trade. The number of hogs packed in this year was nearly fifty thousand. Among additions to business enterprises, is the Peoria Sugar Refinery, with a capacity for five thousand bushels per day; the Grape Sugar Works, and the Starch Company's works.

The following table gives some idea of the business of Peoria in 1879:

Commodities.	Receipts.	Shipments.
Wheat, bu	694,275	635,840
Corn, bu	8,972,280	6,667,150
Oats, bu	4,433,080	4,449,150
Rye, bu	816,675	666,625
Barley, bu	655,400	325,050
Total, bu	15,571,710	12,733,815
Flour, bbls	89,324	63,845

In the same year Peoria district paid $8,624,053 internal revenue. The payment in a single month rose above that at Cincinnati, usually counted the largest internal revenue paying district in the United States.* A single distillery uses 5,000 bushels corn daily. Over 12,500 cattle are fed at once at the distilleries. For the year ending June 30, 1881, the Peoria district paid $11,425,104.29 internal revenue.

* Bradstreet's, Dec. 18, 1880.

Rockford, on the charming Rock river, manufactures watches, agricultural implements, and miscellaneous articles. Moline and Rock Island, virtually one city, at the mouth of the same river, possess an enormous water-power in connection with the government improvements in the adjacent channel of the Mississippi; and their manufactures are growing accordingly.

At Quincy, the bold bluff of the Upper Mississippi recedes from the bank; and a location was thus marked for population to gather above the broad, fertile bottom lands and swamps, to be improved in cultivation, for traffic and for manufactures: in which latter thirty-five hundred men are employed. A vast outlay and great labor have been expended in levees to redeem rich lands below Quincy. Alton, at the beginning of the American bottom, three miles above the mouth of the Missouri, has a number of flouring mills, glass works, car shops, and other industries. It makes a specialty of lime.

In Michigan, thirteen cities claim the attention. Lansing, the present capital, on the Grand river, has a good water-power and corresponding manufactures. Michigan being a well-wooded State, her manufactures are largely characterized by that fact. Detroit, first important for its military relation to the Upper Lakes, commanded the commerce of the same region when peaceful interests took the precedence. It is beautifully situated, well drained, well furnished with water, and has a good fire department. The public offices, both for the city and for the lake marine service of the general government, are substantial edifices. Here is the headquarters for the lake survey, for the lake light houses, for the military department of the lakes. The banking, the commerce, the manufactures, are active, but with a quiet strength that betokens the accumulated wealth of an old community. Its tobacco works are said to be the most extensive in the country.

The following table indicates part of the business of Detroit, for the year to March 1, 1880:

Commodities.	Receipts.	Shipments.
Flour, bbls.	202,224	148,475
Wheat, bu.	11,398,455	8,973,797
Corn, bu.	307,253	111,930
Oats, bu.	447,480	67,500
Barley, bu.	337,220	41,480

The receipts of tobacco at Detroit, in 1879, were 2,614,237 pounds; and the shipments, 1,201,191 pounds. The traffic for 1880 was much greater in corn, but not greatly different otherwise. Detroit has a large interest in the copper and iron mines of the Upper Peninsula of Michigan, and in the silver mines of the celebrated Silver Islet region, on the Canada side of Lake Superior. Her manufactures are important. In the item of iron safes, the business has expanded fivefold within a brief period. Tobacco is the heaviest manufacturing interest of Detroit.*

Adrian, on the Raisin river, builds cars and makes car furniture, in the shops of the Lake Shore & Michigan Southern Railroad. Ann Arbor, on the Huron river, is noted as the seat of Michigan University. There are valuable mineral springs near the city. At Flint are the institutions for the deaf and dumb and blind. Bay City, on the Saginaw river, furnishes salt and lumber: so does Saginaw City, lower on the Saginaw river, while East Saginaw has a large trade by lake and by rail in lumber and salt, has extensive saw-mills, and is the base of supplies for a large lumber region. At all these points, the salt is economically boiled with the slabs and waste of the lumber mills. The business of the Saginaw district in which these three cities have grown up, is tabulated below. The total product of lumber in 1880, was 863,856,009 feet. I give the lumber shipments for ten years:

Years.	Lumber, ft.	Shingles.	Years.	Lumber, ft.	Shingles.
1871	516,639,474	142,661,500	1876	453,227,252	105,748,050
1872	499,894,990	87,204,500	1877	539,966,047	162,594,250
1873	453,768,562	88,031,500	1878	526,350,041	151,883,500
1874	448,707,632	89,154,500	1879	679,481,896	211,017,250
1875	445,149,155	117,889,500	1880†	769,873,312	168,313,300

The first salt was made in 1859. The following table shows the growth of the manufacture, which makes it now the largest salt producing district in the country, giving the quantity for each year, in barrels of five bushels each:

Years.	Barrels.	Years.	Barrels.
1860	4,000	1876	1,462,720
1871	723,175	1877	1,960,997
1872	734,451	1878	1,505,264
1873	852,845	1879	2,052,040
1874	1,038,979	1880‡	2,675,598
1875	1,081,605		

* Bradstreet's, Jan. 8, 1881. † Id., Dec. 4, 1880. ‡ Id., Dec. 31, 1880.

Grand Rapids, at the head of navigation on the Grand river, is celebrated for its furniture factories, its brush factories, and its gypsum beds. The river falls seventeen feet, with immense power. Jackson is in the coal fields. The State Prison is located at this place. Kalamazoo, on the Kalamazoo river, with splendid water-power, and good public works, is the location of the Insane Asylum. Muskegon and Port Huron are largely engaged in lumber and wood-working. Indeed, Muskegon produced, in 1880, more than two-thirds as much sawed lumber as the whole Saginaw Valley district. Port Huron is now conspicuous as one of the chief ports of entry on the lakes.

Madison, the capital of Wisconsin, has rare beauty of situation between two lakes—one fourteen miles long, beyond which is the Insane Asylum. Within the city stands the State University, a noble institution. Milwaukee is upon a bay and river of the same name, and has one of the best harbors on the Upper Lakes. A great part of the wheat of Minnesota, Northern Iowa, and Wisconsin, centres here, and makes this one of the great grain markets of the world. The inevitable close of lake navigation by the winter's cold subjects the city of Milwaukee to a disadvantage in the winter; as most of the freight east bound from the extreme Northwest must pass around the south end of the lake. Iron is first in its industries, then flour, lager beer, leather, pork packing. It is third in point of dryness among the United States meteorological observation stations. The lake greatly modifies the extremes of heat and cold; and the death rate is the lowest for any city of the Northwest.* This city has a large German population. According to the Board of Trade report, the total volume of business in Milwaukee, in 1879, was $435,025,197.38. The total number of hogs packed in 1879–80 was 408,390. The amount of wool shipped was 5,030,333 pounds. Of lumber, Milwaukee received, in 1879, 180,722,000 feet, mostly by the lake. Of beer, 548,770 barrels were sold in 1879. As in Michigan, the prevalence of timber determines the predominant manufactures of Wisconsin. Besides wood work, Appleton has iron and woolen works, with forty-nine feet fall in the Fox river for power. Eau Claire, at the junction of the Eau Claire and Chippeway rivers; Fond du Lac, "Source of the Lake," with its lake navigation and good agricultural surroundings, and a thousand artesian wells; Green

* William P. Lynde.

Bay, adding lake fisheries; Oshkosh, with a State Normal School, a State Prison, and an Insane Asylum, (the second city of the State in wealth and commerce), are all busy with lumber, as well as La Crosse, on the Mississippi, which has the largest register of tonnage between St. Paul and St. Louis, with the largest steamboat building yard above St. Louis, and which in 1879 sawed 74,165,000 feet of lumber, packed 47,000 tons of ice, brewed 25,107 barrels of beer, and packed 8,000 hogs. Janesville and Watertown, on the Rock river, have each a good water-power, in a fine agricultural region. Racine, on Lake Michigan, is the fourth city of the State.

The beautiful table lands adjacent to the mouth of the Minnesota river present many choice sites for cities. The capital, St. Paul, was located a little below the mouth of the Minnesota. The government held a large reservation at Fort Snelling, just at the mouth. A little later, the great manufacturing facilities at the Falls of the Mississippi attracted capital; and St. Paul and Minneapolis are but a part of the population drawn as one to that vicinity. On the St. Croix, a few miles away, is the flourishing lumbering city of Stillwater, with its saw mills, wooden ware factories, and a number of other important industries. Farther down the Mississippi is Winona, with an excellent State Normal School, several thriving manufacturing industries, and a flourishing trade.

The city of St. Paul has active commerce and extended manufactures; but the tremendous water-power of the Falls of St. Anthony gives Minneapolis the advantage in milling of all kinds. Here more capital is invested in flour mills than in any other city in America. No other city has flour mills of such capacity; two of them being larger than any others in this country. Improved processes increase the product and enhance the quality. The capacity of mills built and under contract in 1879 was over nineteen thousand barrels a day. The following gross items show something of the transactions at Minneapolis: Lumber—shipments, 139,450,000 feet; receipts, 29,480,000 feet in 1879; flour—shipments in 1878, 940,786 barrels; in 1879, 1,551,789 barrels; gain in 1879, 611,003. Receipts of grain (wheat, corn, and oats), 8,371,631 bushels; shipments, 320,900 bushels. Aggregate value of cattle, hogs, and horses marketed, $1,650,000.* Total business of 1879, $62,801,513.

* Board of Trade Report.

The first bridge over the Mississippi was built at Minneapolis in 1854. The water-power produced by a fall of some eighty feet in less than a mile, gives 120,000 theoretical horse power, six times that of all France, and seven times that of England. The lumber sawed in 1880, reached 165,000,000 feet; and the value of the manufactures of the city is set at $25,000,000.* The largest saw-mills on the river are at Minneapolis.

St. Paul has a great wholesale trade, reaching into Dakota and to Montana. With a spirited local rivalry between Minneapolis and St. Paul, they are in many respects united in their interests. Hourly trains give easy access to the factories and mills and salesrooms of each. The movement for shipping grain in barges from St. Paul to New Orleans, for foreign use, is looked upon with hope by the people of this region. In June, 1881, wheat was experimentally shipped from St. Paul to Glasgow, Scotland, by the river route. The barges now prepared can carry nearly 5,000,000 bushels a month.†

In Iowa, ten cities have over seven thousand five hundred population each. Along its beautiful internal rivers the water-power is of great value. Its great boundary rivers are not trained to turn factory wheels yet, except at rapids. Des Moines, the capital, on the river of the same name, where the Raccoon empties into it, and in a great coal field; Cedar Rapids, on the Cedar; Keokuk, on the Mississippi, with its fine water-power from the canal around the rapids; Ottumwa, on the Des Moines, of great railway importance—all have large manufacturing capabilities; and each is actively trafficing in the grain and the meat of this fertile region. The following is a summary of the business of Des Moines for the year 1880: Manufacturing, $9,431,630; wholesale trade, $12,325,452; retail trade, $9,042,045; grain and produce, $2,665,100; coal trade, $1,055,850; improvements, $2,259,039; pork packing, $2,456,000; lumber, $1,575,000.

Cedar Rapids had, in 1880, a capital of $1,577,000 in manufactures, employed 1,380 hands, packed 500,000 hogs, and had a mill that could make oat-meal at the rate of 585 barrels a day. The Cedar gives it 2,000 horse power, the best water-power in the State. The trade amounted to $2,097,697.‡

There passed through the government canal at Keokuk, in 1879, 927 steamboats, 629 barges, 152 rafts, carrying 14,500

* Bradstreet's, Dec. 4, 1880. † *Id.*, Aug. 6, 1881. ‡ *Id.*; Jan. 22, 1881.

passengers, 80,000 tons merchandise, 2,500,000 bushels grain, 133,000,000 feet of lumber, and 16,000,000 feet of logs.

Along the Mississippi river, Dubuque, picturesque of situation, is rich in lead, active in manufactures, boasts a bridge across the river, and has one of the oldest scientific associations in the West. Clinton also has a bridge over the Mississippi. It and Lyons, within sight, are Iowa's chief lumbering centre; and both of them are otherwise largely engaged in trade and manufactures. Davenport, with convenient coal, has extensive saw mills, planing mills, breweries, publishing houses, and other industries, and a commerce of several millions a year. It looks from its bluffs upon the government works on the opposite island, and upon the busy homes of Rock Island, over the great bridge, while it is justly proud of its schools and of its scientific society, which owns a neat building, said to contain the best collection of Indian relics outside the Smithsonian Institution. In 1879 it handled 1,364,105 bushels wheat, 609,816 of corn, and 1,141,956 of barley. Its manufactures employed $1,787,310 of capital, with products worth $3,687,100. There were over 64,000,000 feet of lumber manufactured, having a total value of $624,888. Burlington, where the enormous traffic of the Burlington & Missouri and other western roads crosses the Mississippi, has a fine interior and river trade, and flouring mills, breweries, saw mills, and many minor industries, the whole doing a large business. Muscatine manufactures large quantities of lumber, sash, doors and blinds, canned corn, vegetables and fruits, flour, etc., and deals heavily in fine stock. On the Missouri, Council Bluffs, at the end of the great bridge over the river, is the legal terminus of the Union Pacific Railroad, the chief focus of all the great trunk lines between the Atlantic and Pacific. It packed 32,000 hogs in 1879, contains flouring and grist mills, breweries, a woolen factory, several publishing establishments and machine shops, engages in numerous local manufactories, and carries on an extensive commerce with the surrounding country and the Upper Missouri. It has the State Asylum for the Deaf and Dumb. The cities of Iowa are so distributed that no one has such commanding advantage as to make it metropolitan, but each is thriving and vigorous in the midst of its local advantages.

The early French village of St. Louis lay close along the river, with some exceedingly narrow streets, that remain to this

day. The streets widen out as one goes back two or three blocks; so that Fourth street, parallel with the river, becomes roomy and elegant, and streets hardly wide enough for two street drays and four foot passengers abreast between the buildings at the river front, widen to handsome drives west of Fourth street. The old is preserved in the new as in no other large city of the West.

Nature marked the site of St. Louis for a large city. Three great rivers unite in the vicinity, gathering the little boats of primitive life or the more massive ones of busy commerce. From the mouth of the Missouri southward for a long distance, the bottom lands, subject to overflow, are against building any city on the east shore. On the west bank, there is usually a narrow flat subject to overflow, or a lofty bluff overhanging the water. At St. Louis, there is a limestone ledge that forms a permanent wharf-line, so high that water rarely enters the cellars of the front buildings, which are low enough to avoid excessive labor in moving goods. The light boats of the upper rivers can here double their loading upon larger craft for the deeper current of the Lower Mississippi; and here the great loads of sugar and molasses can be easily subdivided for distribution up the Missouri, the Upper Mississippi, and the Illinois. This was more important before the railroad system modified affairs. In the origin of this city, the old fur-traders established their depots here, where the Indians of all the Northwest, even from the Great Lakes, could reach them direct with their canoes. As the years went on, the immense wealth of lead mines and, later, of iron, with the coal under foot, gave strength to St. Louis. The trade with the plains and with Mexico centered here. In the push of new settlement and the introduction of railroads, St. Louis no longer has sole control of such an area; but it grows, with its manufactures and its traffic, the generous rival of younger partners in the Western commerce.

Its situation is favorable for good sewerage, varied enough to avoid monotony; and it claims the lowest death rate among the large cities of the continent. Its parks are justly its pride. The great bridge over the Mississippi is one of the engineering wonders of the age. In 1870, St. Louis was the fourth city in manufactures in the United States. Its flour is at the head of the English market.

Below is an interesting table showing the comparative business in leading articles at St. Louis for 1877, 1878, and 1879:*

Articles.	1877.	1878.	1879.
Flour, amount manufactured, brls	1,517,921	1,916,290	2,142,949
Flour, amount handled, brls	2,988,328	3,688,872	4,154,754
Wheat, total receipts, bush	8,274,151	14,395,431	17,093,963
Corn, total receipts, bush	11,847,771	9,009,726	13,260,636
Oats, total receipts, bush	3,194,721	3,883,976	5,002,165
Rye, total receipts, bush	472,909	845,963	713,726
Barley, total receipts, bush	1,396,490	1,517,304	1,831,517
All grain (including flour reduced to wheat) bush	30,685,700	36,107,384	46,087,078
Cotton, receipts, bales	217,734	383,340	472,426
Hemp, receipts, bales	7,980	5,067	4,072
Bagging, manufactured, yards	7,000,000	7,500,000	8,000,000
Hay, receipts, bales of 400 lbs., bales	332,344	330,961	461,279
Tobacco, receipts, hhds	28,064	25,970	30,278
Lead, receipts in pigs 80 lbs. average, pigs	790,028	764,357	817,594
Hog products, total exports, lbs	176,434,708	188,522,593	220,891,273
Cattle, receipts, head	411,969	406,235	490,654
Sheep, receipts, head	200,502	188,095	182,946
Hogs, receipts, head	893,319	1,451,634	1,763,234
Horses and mules, receipts, head	32,653	27,978	33,905
Lumber, receipts, feet	163,304,150	189,238,333	230,966,361
Shingles, receipts, pcs	64,919,000	88,059,000	77,811,500
Lath, receipts, pcs	15,973,200	33,998,000	27,713,700
Wool, total receipts, lbs	15,531,975	18,489,816	20,756,743
Hides, total receipts, lbs	20,001,031	17,129,894	20,042,734
Sugar, received, lbs	93,643,672	103,896,225	107,176,063
Molasses, shipped, galls	1,636,208	1,844,260	1,694,960
Coffee, received, bags	197,009	201,080	267,533
Rice, receipts, brls	22,868	25,600	34,213
Coal, receipts, bush	25,856,850	33,087,300	26,978,150
Nails, receipts, kegs	510,590	533,399	575,533
Potatoes, receipts, bush	753,907	602,675	963,047
Salt, receipts, brls	202,377	271,521	244,906
Salt, receipts, sacks	104,406	78,781	73,345
Salt, receipts, bush. in bulk	.....	.....	439,788
Butter, lbs	.....	8,627,056	8,961,965

Unfortunately, the industrial statistics of St. Louis are not yet completed. In the last census, the value of the product of her manufactures was given at $158,761,013, and the invested capital at $60,357,001, an investment equal to that of Cincinnati, according to the State report of 1879. It is fair to presume that the increase during the decade just closed has been in correspondence with the general growth of the city in population and wealth. The breweries of St. Louis during the past year produced nearly 20,000,000 gallons of beer; the product of its twenty-four flouring mills aggregated 2,142,949 barrels, against 1,916,290 for 1878. The total amount, including that

* Board of Trade Report for 1880.

handled by millers, etc., exceeded 4,154,000 barrels. But by far the greatest triumphs of this city, within the past few years, have been in the great increase in cotton receipts. St. Louis is undoubtedly destined some day to become the largest market and the controlling inland cotton centre of the continent. Ten years ago (1870) but 20,270 bales were received at St. Louis. Since then the trade has rapidly increased; and the receipts from Sept. 1, 1879, to Feb. 27, 1880, were 430,752 bales, or about 100,000 more than for the year previous. The aggregate amount of wholesale grocery trade of St. Louis is estimated at $22,000,000. The iron trade is active. The inexhaustible deposits of iron ore in the State of Missouri, and the abundance of coal supply, have built up an immense iron industry, which possesses wonderful possibilities of development in the future.

St. Louis is the largest flour-making city in the country, the largest horse and mule market, (claiming to have received 50,000 in 1880,) and manufactures more saddlery, harness, and tobacco than any other Western city. If Minneapolis mills manufactured up to their full capacity, they might exceed the flour-product of St. Louis.

Kansas City, on the west boundary of the State, at the junction of the Kansas and the Missouri rivers, where the latter turns to the eastward, has had a tremendous growth in the development of the new lands of the West, with their agricultural and mineral resources. Situated in the midst of great material wealth, the railroad systems that reach away beyond it, especially toward the cattle regions of the Southwest have centered here. In the sudden activity of their new commerce, the citizens have not had time to pay much attention to ornamentation; and the hills are too recently graded for green velvet lawns to prevail. The following are the total grain receipts at Kansas City for the year 1878 and previous years, stated in bushels:

Dates.	Wheat.	Corn.	Oats.	Rye.	Barley.
1871	687,000	350,000	.....	.....	.....
1872	269,726	401,264	93,695	12,921	3,097
1873	750,400	893,900	101,300	10,500	13,200
1874	371,273	711,267	210,475	3,400	27,420
1875	1,366,527	1,258,700	269,880	40,000	15,100
1876	1,320,227	5,709,395	117,341	294,619	109,045
1877	2,309,573	5,861,703	180,557	329,397	202,941
1878	9,014,291	4,911,889	155,069	853,303	168,397

The transfers of real estate for 1879 amounted to $5,449,000; the clearing house transactions to $68,280.25. The total grain receipts for 1879 were 11,073,000 bushels; mill products, 62,943 barrels of flour; 2,765,315 hundred weight of bran, meal, etc. The receipts of live stock were $362,007.

Hannibal has a bridge over the Mississippi, and an active lumber trade. Sedalia is a city that has grown, remote from navigable water-courses, by the development of interior commerce and manufacturing, in a region where, by the aid of railroads, great mineral wealth, rich agricultural resources, and excellent timber, are brought within reach of each other. Two railroad companies maintain their shops there. St. Charles, on the Missouri, was important in the Spanish and French times. A bridge spans the Missouri; and the manufactures are important. It is the oldest white settlement on the Missouri river, and even disputes priority of settlement with St. Louis. The channel of the river has been threatening to turn from the bluffs on which St. Charles is partly built, and the government is executing a great work to protect the present channel. St. Joseph, one of the oldest towns west of the Mississippi, was the great outfitting point for California in 1849. Its wholesale trade is enormous. A cracker bakery is a prominent specialty. A great bridge spans the Missouri at this point also.

In Kansas, the capital, Topeka, is a railroad centre of growing importance, and a busy manufacturing place. The situation, high and commanding, on the Kansas river, encourages the beautifying of streets and of the homes. A rolling mill for steel rails employs one hundred and fifty men.* The sales of various commodities reached $5,442,498 in 1879.†

Atchison and Leavenworth, on the Missouri river, divide with St. Joseph, Missouri, the distributing trade that comes to their vicinity. Each has a great bridge, each has great manufactories, especially of furniture. Leavenworth has the Leavenworth government reservation and the Penitentiary adjacent. Its manufactures in 1879 reached $1,015,000, of which nearly one-half was in wagons and carriages, and a fifth in stoves.

Lawrence has put a dam across the Kansas river, and has a water-power of great value. It is the second city in wealth and population in the State. Founded in the Free State struggle in 1854, it had a large share in the stirring events of those days.

* Ed. *Commonwealth.* † *Commonwealth*, Jan., 1880.

Wichita, southwest of Leavenworth, in the Arkansas valley, not far from the Indian Territory, is one of the most thrifty, enterprising cities of this rapidly growing State. In the midst of the richest winter wheat section, and in the direct path of the commerce of the far Southwest with the East and North, it seems destined to enjoy a long continuance of that prosperity which has so suddenly raised it into its present distinction.

Lincoln, the State capital of Nebraska, has the State University, the Insane Asylum, and other public institutions, with mills, machine shops, and the trade of a rich agricultural region. Omaha is the Eastern headquarters of the Union Pacific Railroad, and reaches forth with a wide network of roads into the fields and the pastures and the mines that lie more than a thousand miles beyond. Its car shops and its silver smelting works are on a large scale. Its lead works are extensive; and its nail works are important. The newness of the city has outrun such improvements as require time; but wealth and taste are doing their work. Its commerce, in 1879, reached $40,000,000.* Nebraska must raise much of the food for the mining regions beyond; and the traffic in the ores and metals, and in the meat and bread for the miners that produce them, will make a strong city, standing, as it were, just in the gateway between producers and consumers. In 1879, between 700 and 800 buildings were erected here at a cost of $1,200,000.

Denver, on the South Platte river, near the Rocky Mountains, has a United States Branch Mint. It is 5,375 feet above the sea, and is the business focus for a rich mining region, at which many railroads centre. It is famed as a health resort. It has an immense trade in canned food. The gross sales of merchandise in 1878 were $18,000,000, and in 1879 they were $26,000,000. Telephones connect Denver with all places of any size within a radius of seventy-five miles. Denver shipped in 1880, 32,213,141 pounds of lead, valued at $766,455.22; 3,663,183 pounds of silver ore, at $4,029,591.30; 8,020 pounds of gold ore, at $160,400; the total valuation being $4,956,356.52.

Leadville, a city scarcely three years old, is over deposits of carbonate of lead, rich with silver, that have kept miners busy long enough to give opportunity to establish already many of the financial and social institutions of manufacturing and commercial cities.

* Third Annual Board of Trade Report.

Salt Lake City, eleven miles from Salt Lake, is a unique city. Its policy was fixed by the Mormons in their isolation before the days of California gold or of overland railroads. The streets are 137 feet wide, the blocks forty rods square, along which water is conveyed for irrigating. Shade and fruit trees border them. The great Tabernacle, and the great organ, second to but one on the continent, are the wonder of visitors. Its traffic in agricultural products is growing. Dried fruit of superior excellence is sent out to the value of $100,000 a year. A million dozen eggs and a million pounds of butter were sent to Nevada and Colorado. Its manufactures are estimated at $4,000,000. There are ten woolen factories, producing $1,000,000 worth,* and two boot and shoe factories.

Virginia City, in Nevada, is six thousand feet above the sea level, near gold mines that had yielded, in 1876, over $40,000,000. Assessments for other mines had reached so far towards that amount that the question for and against the mining for profit was closely balanced.

San Francisco was first settled in 1776 as a Spanish military station and a Franciscan mission to Indians. Till the time of the Mexican War, there was little growth or activity in all California; but, in 1848, the discovery of gold in the sands of California streams directed a great tide of migration to the Pacific Coast; and nature had given San Francisco almost an absolute monopoly of the harbor privileges of two thousand miles of coast. Its growth was rapid; its enterprises were magnificent; its hotels were the grandest, its ventures the most daring, and its speculations the wildest, in modern commercial history. As the country gained age, and surface mining wore out, more distant and more costly mining was managed from San Francisco; and the losses and the gains in that city upon ventures in Nevada and in Colorado have been enormous.

A great traffic has grown up in the development of the permanent grain and fruit resources, as well as in its commanding relation to Asiatic commerce. A stone dock will receive a vessel of 6,000 tons. The presence of Asiatics adds Buddhist worship to the forms found in other great cities of the United States.

San Francisco is on a tongue of land extending between the Bay and the ocean—sandy, dusty, rocky in different parts, hardly green anywhere. It needs Oakland as its complement,

* Bradstreet's, July 31, 1880.

a beautiful suburb half a dozen miles across the Bay, with groves and gardens, and beautiful streets, that, with improvement of its water approaches, must some day share the commerce of San Francisco. The manufactures of both cities are important. The vicinity of mines, and the fruit of California, give special form to her manufactures. The foreign business of California must mainly pass through San Francisco, for which I give some tables. The following are items of this business in San Francisco for the year 1879:

Foreign imports	$32,524,279
Foreign exports	$31,395,174
Exports by rail	$30,000,000
Gold and silver coined in the United States Mint	$38,085,700
Precious metals produced	$77,610,000
Lead product of coast	$4,100,000
Quicksilver in flasks	$79,497
Wheat crop of California (centals)	20,000,000
Barley	$7,000,000
Wool clip (pounds)	46,000,000
Vintage (gallons)	5,000,000
Value of fruit crop	$3,500,000
Value of Pacific mining industries	$57,260,000
Lumber receipts (feet)	226,000,000
Export of precious metals since 1848	$1,283,712,064
Product of precious metals on coast since 1848	$2,188,061,188

The following exhibits general items of business for the State at large, for the year 1880:

Wheat product (centals) and flour exported	28,250,000
Barley crop (centals)	11,134,409
Sugar imports (pounds)	76,272,825
Beet sugar, product (pounds)	2,172,660
Coffee imports (pounds)	20,700,000
Rice imports (pounds)	50,407,584
Tea imports (pounds)	22,078,524
Gold and silver yield	$60,168,000
Coinage United States Mint	$37,427,000
Lumber imports (feet) San Francisco	314,386,400
Wool clip (pounds)	46,074,154
Wine (gallons)	12,000,000
Quicksilver flasks	57,093
Value of manufactures (San Francisco)	$60,000,000

San Francisco is enlarging its sugar refineries in the impetus given to the sugar traffic by the Sandwich Island product, which is controlled in the United States, and is brought raw to San Francisco. In 1880, 216,301 cases of salmon were shipped east from San Francisco. In 1880–81, there were exported 13,367,767 centals of wheat, valued at $19,023,615; 1,289,498 centals of barley, at $1,534,475; 662,093 barrels of flour, at $2,911,066. Low prices lessened the value of grain export $1,027,110 from 1879 to 1880; but the quantity increased 2,842,359 centals.

California makes 4,000,000 jute bags a year. The wool product for the year to June 30, 1880, was 22,471,429 pounds, of which 21,124,230 pounds were exported.

Among other towns, the capital, Sacramento, on the Sacramento River, was closely identified with the early gold mining. The golden sands of that river drew a multitude to the valleys, which now yield rich agricultural returns also. The business with the mining districts is large. Stockton commands the trade and the golden harvests of the San Joaquin valley grain fields, and the riches of the Calaveras mines. It is sometimes called the city of windmills, from the multitude of these structures used in pumping the water for the people. San José, in the Santa Clara valley, exults in its abundant and luxuriant growth of fruit, and its artesian wells. Los Angeles, in Southern California, is famous for its healthfulness and for its fruit. Its full name is Pueblo de los Reina de los Angeles—the village of the Queen of the Angels.

The mountain valleys of Oregon are so much separated by rugged ridges that population has not massed itself densely at any point. The Columbia river opens a way for a harbor through the general coast barrier; but a bar interferes with the entrance from the sea. Portland transacts the chief commercial business of the State and of the adjacent portion of Washington Territory. Much of this goes direct to Europe, but the greater part first to San Francisco. A large Scotch capital is invested in banking at Portland, which claims to be the second city of the Union in wealth, in proportion to population.

Wheat and flour, canned salmon, and wool, are the chief exports of Oregon. The value of wheat exported from the Columbia river in 1879, was $6,600,159. The wool clip of Oregon for 1879 was over $8,000,000 in value. For the year to August, 1879, there were 412,924 cases salmon exported from the Columbia river. A singular instance of the working of moral law in trade has impressed itself on the salmon fisheries. "The morals which govern trade and commerce can not be violated," says the Portland Trade Report in narrating the damage done by dishonest packing of unsound fish.

There is an average of eighteen feet water at Portland; and improvements upon the Columbia will give deeper draught. With the growth of system in Alaska, an improved channel in the Columbia, and the filling of the adjacent valleys by settlers,

Portland looks hopefully for a large share of Asiatic and coastwise trade, as well as a share in overland railway traffic to reach her over the Northern Pacific.

The formidable barrier character of the coast is shown in the fact that this port, 110 miles up the Columbia, or strictly ten miles up the Willamette from the Columbia, with the smaller Astoria, near the mouth, form the only competitors of the great Bay of San Francisco on all the Pacific coast of the United States.

CHAPTER XXVII.

RAILROADS, CANALS AND PUBLIC LANDS.

FORTY years ago a most extensive system of internal improvements had been begun, not only in the Western States but over the entire country, and, for the purpose of covering the expenses of these important works of public improvement, as was shown in the first chapter, an enormous amount of State debts had been incurred. "New communications," said one writer, when commenting on the financial embarrassments of 1840, "have been opened by railroads and canals between different parts of the country, generally at points where they were really wanted, and will be of important service. In some few cases the rage for speculation and facility for obtaining loans which characterized the period when the debts were contracted, may have given rise to projects not precisely of this character; but the worst that can be said of them is that they are premature." At that time the population and business of the country were rapidly growing up to these improvements, and, as subsequent events have shown, many of the enterprises which at that period of our history seemed to bid fair to bankrupt the States that had promoted them, now are profitable investments.

Americans have not much taste for cathedrals and palaces, but the useful magnificence of roads and bridges excites their admiration. They knew well enough that a canal or a railroad piercing a great tract of country would be of great importance to them. They quite comprehended its objects, and did not underestimate its effects. When their hopes had been raised,

* In making up the tables of railroads, some authorities include the mileage of a corporation extending into another State, while others carefully exclude it.

Some give as miles of railroad the distances between points joined by railroad, while others add double track and switches.

A third and frequent cause of variation of tables is, that, in the twelve months of a year, in the progress of railroad building, the facts change many times in the year, and the table made in June will not agree with that of January, or with one of December, yet may fail to indicate the month of its preparation.

The railroad measurements in this chapter are likely to vary from those given elsewhere, for one or more of these reasons. The authority for the figures given is indicated.

and their judgment somewhat disordered by the fever in their veins for public improvements, and they saw the means of accomplishing these great objects, it is not strange that they became incautious and prodigal somewhat in proportion to the ease with which the capital to prosecute them was obtained.

There are no means of ascertaining how much money had at this time been expended to facilitate transportation, but judging from the large amount of State debts that had been contracted, it must have been very large. At the close of 1839, $170,000,000 of debt had been authorized by the eighteen States, without counting the surplus revenue funds of the federal government. Of this $170,000,000, $52,640,000, or about thirty-one per cent., had been incurred in aiding the State banks; $60,201,551, or about thirty-five per cent., in building canals; $42,871,084, or about twenty-five per cent., for railroad aid; $6,618,958, or about four per cent., for turnpikes and macadamized roads; and for miscellaneous objects, $8,474,684. Thus it will be seen that nearly $103,000,000, or about sixty per cent. of this entire amount, was expended for the improvement of the system of internal transportation. Of this amount, Illinois had expended over $11,600,000; Indiana, $11,890,000; Missouri, $2,500,000; and Michigan, $5,340,000.

Forty years ago the history of railroads in the States treated in this volume, lying west of the Mississippi, was comprehended in a dozen printed lines indicating plans for roads in Missouri, from St. Louis to the Iron Mountain; from St. Louis west, crossing the Missouri river at St. Charles; from St. Louis west, south of the Missouri, and connecting the Mississippi at Louisiana with the Missouri at Columbia. Except some sparse settlements in Iowa Territory, all else to the north and west was essentially an unsettled blank. East of the Mississippi, in 1840, Wisconsin Territory had only plans and surveys for railroads, authorized by the general government. Railroads were proposed from Milwaukee to the Mississippi river; from Lafontaine to Winnebago Lake; from Belmont, the territorial capital, sixty miles southwest of Madison, to Dubuque; from Belmont to Dodgeville, via Mineral Point. Congress granted land for a canal from Milwaukee to Black River, in 1839.

Ohio in 1825 adopted a great system of internal improvement. She depended on direct taxation, and authorized the commissioners of the canal fund to borrow on State credit, at an interest not

exceeding six per cent., such sums as would be sufficient to complete the canals; and an extensive system, well built, was the result. The chief canal was the Ohio and Erie, from Portsmouth on the Ohio, at the mouth of the Scioto, to Cleveland on Lake Erie, 307 miles. This had various branches; one of ten miles to reach Columbus; one to Lancaster, nine miles, extended to Athens, fifty miles; one to Zanesville, fourteen miles; one in the valley of the Walhonding, twenty-three miles; the Granville branch, six miles; Eastport branch, four miles; Dresden branch, two miles; which last brought Marietta into connection with the main line. The Miami Canal extended from Cincinnati to Defiance, on the Maumee, 178 miles, whence, eighty-seven miles of the Wabash and Erie Canal completed the connection with Lake Erie at Toledo. This had a branch into Warren county, twenty miles long.

There were two lines, running, one from Bolivar, the other from Akron, and meeting at the mouth of the Beaver river, thirty miles below Pittsburg, the first seventy-six miles long, the second seventy-seven miles in Ohio and eight in Pennsylvania. A canal of three miles enabled lake steamers to get to Milan from the Huron river.

The Mad River & Sandusky City Railroad was in use between Sandusky and Tiffin, thirty miles; the Ohio Railroad extended from Manhattan, on the Maumee, to Sandusky, with a length of forty miles; thirty-three miles of road connected Toledo with Adrian, Michigan, and plans were formed for many more canals and railroads.

In Michigan no canals were ready, but the Central Railroad connected Detroit and Ann Arbor, forty-four miles; the main part of the road from Toledo to Adrian, referred to under Ohio, was in Michigan; Ypsilanti and Tecumseh were joined by twenty-five miles of railroad. Detroit reached Pontiac, twenty-five miles away, with a railroad. This work was done by the State, as a beginning upon an extended system of canals and railroads.

Indiana had marked out a scheme of public works likely to cost $21,000,000, to form a continuous whole with those of Ohio on the east and of Illinois on the west. The Wabash and Erie Canal followed along the Maumee from Toledo, and, passing into the Wabash Valley, reached to La Fayette, nearly 100 miles in Indiana. Also thirty miles of the Whitewater

Canal, from Lawrenceburg on the Ohio to Cambridge on the National Road, were in use. This canal made a detour that took it across the Ohio line for a short distance above Cincinnati. The Madison & Indianapolis Railroad was completed for twenty-five miles to Vernon.

Illinois was looked upon as most admirably adapted to the introduction of a system of canals and railroads. The peculiar uniformity of its surface, and the relative position of its rivers, were early recognized as highly favorable to purposes of internal improvement. The Illinois and Michigan Canal extended from the South Branch of Chicago river along the valleys of the Chicago, Des Plaines and Illinois rivers to the head of navigation on the latter. Including five and five-tenths miles of the Chicago river, and the navigable feeder from the Fox, four miles, the total length was 106 miles. A railroad was in operation from Meredosia on the Illinois river, to Jacksonville, twenty-two miles. Most of these railroads were built in a primitive way, with iron straps nailed upon wooden stringers laid on cross-ties* corresponding to the modern ties. A great system was marked out which I need not particularize, for each of the States, but may suggestively indicate that the rivers and the lakes were to be joined at various points, the capitals of the States were to be reached in these systems, and the river valleys were to determine to a great extent the course of canals and of railroads. Many of those early plans seem to have been laid with a foresight justified by the location of the most important lines of to-day on their expected courses, while a few points, then of magnificent promise, have sunk into oblivion. The number of miles of completed canals and railroads in these States in 1840 may be tabulated as follows:†

States.	Canals.	Railroads.
Ohio	841	76
Indiana	180	35
Illinois	105	26
Michigan	.....	129
Totals	1,076	266

* The strap rail gave rise to what were known as "snake-heads." The end of a rail being loosened was liable to be turned up and crowded by the wheels through the bottom of the car, occasionally proving fatal to some one in the car over it.

† Tanner's History Canals and Railroads, 1840.

Let us look at the transportation systems as now existing. Canals have been greatly neglected, and have not been extended in the past forty years, except where absolutely necessary to make short connection between natural water courses. Of this class is the work at the outlet of Lake Superior, in Michigan, where, by a lockage of twenty-two feet, the lake vessels pass freely to and from the rich mining districts and approach the fertile wheat fields whose product finds natural outlet on that lake. Another canal in the same State makes a short passage through the Keweenaw peninsula, being really but a cutting of natural channels into navigable form, but enabling vessels to load copper, almost at the very mouth of the mines, at Hancock and Houghton. The canals of Ohio have not been deemed important enough to appear in the Ohio Statistics, an official publication of Jan. 1, 1881, although the greater part of the system of 1840 is still in use. The Indiana canals have no place in a corresponding volume, published by Indiana, and it is doubtful whether her canals will be restored to use. Some canals have even disappeared, and in a few cases so completely have they given way to the speedier engine that the railway track is laid along the very bed where once the canal boat floated, as where canal boats go into the Cuyahoga river to yield the bed to a railroad into Cleveland.

The modern systems of railroads are of broader scope than mere State lines. They are planned with a national purpose, to bring together the products of labor in the forest, the mine, the shop, and the farm, far removed from each other, and to bind the Union together in ever strengthening ties of commerce, and ready social and political intercourse. The State of Ohio lies where the great lines that point to Western fields, on our own territory, must pass mainly through her borders. I may say just here, not to dwell on the European market to be reached through our seaboard cities, that I shall estimate the great commercial points of the Atlantic coast mainly as a group of starting points for railroads. Some of these roads reach westward from the cities of the St. Lawrence and pass north of Lake Erie, to be noticed when I speak of Michigan. Boston, New York, Philadelphia, Baltimore — all reach even to the Pacific, with their plans for facilitating exchanges. The so-called Lake Shore road reaches along the south border of the lake in Ohio, joining, as an incident of its passage, the oil wells of Pennsylvania and the refineries of Cleveland, touching at Toledo, and taking a

large share of the business centering at Chicago, the goal of so many railroad enterprises. This is perhaps to be classed as mainly a New York enterprise, though Boston traffic also in part takes this route. Coming into the State from Pittsburg is what may be deemed a Philadelphia system, reaching also to Chicago, through Central Ohio and Northern Indiana, but using diverging connections to the cities of the lakes, to Cincinnati, to St. Louis, and to other points on the Mississippi and Missouri rivers. Yet another great road coming over the Ohio river from West Virginia, represents the energy of one of the oldest companies in the country, roused out of an old-time conservatism, to push with the zealous activity of the younger roads. The Baltimore & Ohio is emphatically a Baltimore road, and runs, like those already named, to the Chicago grain elevators and its great beef and pork markets. It reaches Cincinnati by a lower crossing of the Ohio, and it makes a special coal delivery at Sandusky. Its facilities for cheap coal make it a formidable competitor with roads of more favorable grades.

In Ohio there were, in 1880, 5,655 miles of railroad under nearly seventy-five different corporate names, although so operated by leases and otherwise, that the total number of active companies was considerably less. Out of the whole number of *eighty-eight* counties, there were no more than five that did not report assessments of railroad property in 1880, showing that the whole State is very thoroughly intersected by the railroad systems of the present day.

MILES OF RAILROAD IN OHIO FOR EACH YEAR, 1841—1880.*

Years	Miles of Railroad.	Years.	Miles of Railroad.	Years.	Miles of Railroad.
1841	86	1855	1,641	1868	3,256
1842	84	1856	1,669	1869	3,394
1843	84	1857	1,880	1870	3,374
1844	84	1858	2,788	1871	3,488
1845	84	1859	2,807	1872	3,787
1846	84	1860	2,974	1873	4,163
1847	120	1861	3,034	1874	4,374
1848	274	1862	3,024	1875	4,461
1849	274	1863	3,051	1876	4,429
1850	299	1864	3,051	1877	4,719
1851	572	1865	3,176	1878	4,997
1852	890	1866	3,197	1879	4,771
1853	1,385	1867	3,214	1880	5,655
1854	1,500				

* Ohio Statistics, 1880, published by the State. Adding miles of railway not included in the above report, Poor's Manual makes the total number of miles 6,081.

As we pass to Indiana we find what is known as the Wabash system, originally reaching in nearly a direct line from Toledo, Ohio, across Indiana, through Springfield, the capital of Illinois, to Quincy on the Mississippi, but now so extended as to reach St. Louis, with a branch from Decatur, Illinois, and to meet other roads with direct competition at the transfer depot, the eastern terminus of the Union Pacific, opposite Omaha. The Ohio & Mississippi unites Cincinnati and St. Louis, and was originally mainly due to the local enterprise of these two cities. Other roads cross the State to join Cincinnati and Chicago, Louisville and Chicago, and Evansville and Chicago. Along the north border runs the Michigan Central, which, largely in the New York interest, comes to continue the route of the New York Central along the north shore of Lake Erie, but nominally connecting Detroit and Chicago. This also carries a part of the traffic diverted over the Canadian Grand Trunk to St. Lawrence markets.

There were in Indiana, in 1880, 4,085* miles of railroad, nominally belonging to sixty-three companies, but as in the case of other States the short and feeble roads are controlled under leases or otherwise by the strong corporations. Only seven counties in the State are now without railroad facilities, and the railroads cross and recross in every direction.

In Illinois, the city to which so many of these roads have gathered, as a focus, becomes itself a radiating point of tremendous energy. Off to the north, close along the lake shore, till brought to an abrupt termination in the iron cliffs about Marquette on Lake Superior, stretching directly west to the Missouri at Omaha, intersecting this quadrant of country by direct and cross lines to connect with the great capitals and chief cities of Wisconsin, Minnesota, Dakota, and Iowa, crowding forward for the mines of the Black Hills, is the Chicago & North-Western. In the same quadrant of territory the Milwaukee & St. Paul has lately spread its tracks, in brisk competition at important points with the last named road. The Chicago, Rock Island & Pacific was one of the boldest and most vigorous of the roads early pushed west from Chicago. It sweeps down the Illinois river valley till it draws near a stream that drains directly into the Mississippi, which it crosses at Rock Island and Davenport, and it

* Statistics of Indiana, published by State authority. These Statistics are based on assessors' returns. Poor's Manual gives, in all, 4,582 miles at close of 1880.

meets its competitors at the Union Pacific transfer depot, while it reaches off to Kansas City by a branch from its main track in Iowa, for a share of the cattle, the grain and the minerals of the Southwest. Boston, that has slight, if any, distinctive representation between Albany, N. Y., and Chicago, appears to marked advantage in one of the earliest and best managed corporations of the West — the Chicago, Burlington & Quincy. This road runs in a tolerably direct line from Chicago to Galesburg, Illinois, there dividing and reaching the Mississippi, with one track opposite Burlington, Iowa, and with another at Quincy, Illinois. Besides the various branches and cross roads by which this corporation now reaches out far on either side of the original road in Illinois, it also stretches entirely across Southern Iowa, under the name of the Burlington & Missouri River Railroad, to the Union Pacific transfer depot, opposite Omaha. At the mouth of the Platte it boldly crosses into Nebraska by an independent bridge, and, by the name of the Burlington & Missouri River Railroad in Nebraska, with a main track pointing toward Denver and with a junction at Kearney with the Union Pacific, pushes branch tracks in every direction, even into Omaha itself, in local competition with the Union Pacific. It is even believed that at an early day the company means to go to San Francisco with a track of its own.

The Chicago, Alton & St. Louis was a road pushed from Alton to bring St. Louis (by connecting steamers by way of Alton) and Chicago together. Its early history was one of chequered financial experiences, but of late years it has become one of the strong great roads. Besides the original plan, from which steamers long ago disappeared as an aid, it reaches St. Louis by a second track, diverging at Bloomington and passing through Jacksonville, to unite again with the original track near Alton; while, by a second divergence just south of Jacksonville, it sends a track, by a bridge across the Mississippi at Louisiana, Mo., to compete for the Southwestern trade at Kansas City; controlling, also, a track from St. Louis to join this one at Mexico, Mo.

The Illinois Central Railroad is noticed elsewhere as built with a great land grant of 1850, notable as the first of its kind, and for the large contribution its prosperity brings to the State treasury under the stipulation by which the company received the franchise from the State. It stands like a great Y in Illinois, with the base at Cairo, the right arm reaching Chicago, and the left

reaching Dubuque, Iowa. Besides this, however, it is part of a system that brings Mobile and New Orleans in direct rail communication with Chicago. It has minor cross connections, and operates a line across Iowa to the Missouri at Sioux City, and by its connections becomes notably the great connecting iron link of the nation to bind the extreme North and the extreme South in commercial unity.

The total number of persons employed on railroads in the State of Illinois, is reported by the Board of Railroad Commissioners for the year 1880, as 94,561. Of these, 405 are general officers, 162 assistants, 51 civil engineers, 104 master mechanics, 139 road masters, 4,437 clerks, 7,688 machinists, 3,259 conductors, 3,812 engineers, 4,940 firemen and wipers, 1,600 baggage masters, 4,392 brakemen, 29,169 section men and foremen, and 34,443 laborers. The highest average salary of general officers is $5,977; the lowest, $825; the average for all the roads reported being $2,742. The aggregate sum paid to employes of railroads embraced in returns for 1880, was $49,427,729. The returns do not show accurately the number of employes in Illinois, but from the best data obtainable I should estimate the number to be 40,650, and the amount paid, in the aggregate, $21,250,000. The total number of stations in Illinois is 1,633. Fifty railroad organizations of this State report a total of gross earnings from all sources for 1880, of $140,949,675. Of this amount, $34,717,188 was from passengers, $102,096,367 from freight, and the sum of $4,136,109 from other sources. The gross earnings for 1878 were, in round figures, $105,000,000, and in 1879, $109,000,000; the earnings for 1880 showing an increase of nearly $32,000,000. The net transportation earnings per mile on the principal roads compared as follows:

Chicago & Alton	$4,899.68
Chicago, Burlington & Quincy	3,727.96
Chicago & North-Western	5,683.81
Chicago, Rock Island & Pacific	3,822.26
Illinois Central	3,059.35
Indianapolis & St. Louis	2,142.92
Ohio & Mississippi	2,077.67
St. Louis, Alton & Terre Haute	2,992.41
St. Louis, Vandalia & Terre Haute	2,640.30
Wabash, St. Louis & Pacific	2,066.17

The gross earnings of forty-eight roads in Illinois reported for 1880, were, from passengers, $11,782,745, and from freight, $36,678,476; making a total of $48,461,221, as against $41,189,320

in 1879. The returns of the various roads reporting profit show a balance in their favor, after deducting operating and extraordinary expenses and rental, for the year 1880, amounting to $26,000,000, as against the same number of roads reporting in 1879 an amount of less than $15,000,000. The total number of tons of freight carried on all these lines in 1880, was 53,837,586; in 1879 the amount was 37,193,464. The number of tons carried for 1880 in Illinois, was 23,297,544, as against the estimated number of 15,621,254 in 1879.

The following table shows the number of tons carried by the leading roads:

Names of Roads.	Whole Line.	In Illinois.
Chicago & Alton	2,963,947	2,119,223
Chicago, Burlington & Quincy	4,948,959	4,131,694
Chicago & North-Western	5,338,581	3,641,087
Chicago, Rock Island & Pacific	3,070,600	221,180
Illinois Central	2,404,731	2,053,963
Indianapolis & St. Louis	662,923	633,754
Indiana, Bloomington & Western	492,143	307,592
Ohio & Mississippi	1,389,092	819,569
St. Louis, Alton & Terre Haute	578,851	578,851
St. Louis, Vandalia & Terre Haute	946,875	946,875
Wabash, St. Louis & Pacific	3,919,009	1,871,052

Twenty-six roads reporting carried 2,787,624 through passengers, and twenty-four roads carried 622,162 through passengers, in Illinois. Thirty-six roads reporting carried 23,834,476 local passengers, and thirty-four roads reporting carried 10,425,696 local passengers, in Illinois.

Undoubtedly 1880 was a year of extraordinary activity and prosperity for railroads generally, and the revival of this class of business was especially felt in the banner State for railroads. Notwithstanding the fact of the lower rates, the net earnings of the roads of Illinois have nearly doubled. Many roads, in consequence of this increased income, have been enabled to build anew their shattered financial condition; others, seriously threatened, have escaped the courts; while still others have been taken out of the hands of receivers. It is gratifying to know that the rates for freight have been gradually decreasing. The following table, compiled from returns received on twelve representative roads doing business in Illinois, exhibits the rate received in cents per ton per mile, for freight carried during the past five years:

Names of Roads.	1876.	1877.	1878.	1879.	1880.
Chicago & Alton	1.72	.....	1.42	1.11	1.13
Chicago, Burlington & Quincy	1.85	1.50	.....	.....	1.13
Chicago & North-Western	2.00	1.81	1.68	1.53	1.46
Chicago, Rock Island & Pacific	1.85	1.71	1.56	1.43	1.31
Illinois Central	2.01	1.89	1.93	1.92	1.44
Illinois Midland	2.80	1.48	2.16	1.69	0.94
Indianapolis & St. Louis	0.98	1.00	1.08	0.90	0.96
Ohio & Mississippi	1.27	1.04	1.14	0.99	1.09
St. Louis, Alton & Terre Haute	2.60	2.45	2.26	2.39	2.11
St. Louis, Vandalia & Terre Haute	.....	.....	1.28	1.09	1.08
Toledo, Peoria & Warsaw	.....	.....	1.65	1.71	1.46
Wabash, St. Louis & Pacific	1.10	0.87	0.75	0.63	0.70
Average for each year	1.81	1.53	1.59	1.40	1.23

As appears from the foregoing table, the lowering of rates has been gradual and yearly. If shippers, for instance, had had to pay the same rate in 1880 as in 1876, on the roads mentioned, the difference against them in 1880 would have been $17,296,354. The average rate per ton per mile in Illinois for freight, in 1879, including all roads reporting, was 1.92 cents; in 1880 the average rate was 1.38 cents. The number of tons carried in Illinois in 1880, was 23,297,544. The amount saved to the people by the reduction of rates, as above stated, in 1880 over 1879, was $14,355,394.

The great roads of Wisconsin are mainly indicated already, but the Wisconsin Central, joining Menasha and Ashland, may properly be added. At the close of 1880 there were 3,134 miles of road in the State of Wisconsin. The following table shows the miles of road constructed each year in Wisconsin since 1850, the year in which the first piece of road was built in this State:

Years.	Miles of Road.	Years.	Miles of Road.	Years.	Miles of Road.
1850	10.00	1859	87.90	1872	285.70
1851	24.00	1860	17.90	1873	405.43
1852	36.00	1861	20.00	1874	88.60
1853	18.10	1862	55.90	1875	43.47
1854	69.00	1864	69.80	1876	135.43
1855	169.64	1868	58.90	1877	62.34
1856	186.10	1869	51.80	1878	89.30
1857	193.30	1870	153.70	1879	93.73
1858	61.00	1871	417.73	1880	233.49
				Total	3,133.85

The capital stock invested in the roads operated wholly or in part in this State, was returned at $107,583,286; an increase of nearly $5,461,000 over previous years. There was a net increase in the earnings of the roads operating in Wisconsin, of $3,406,738. The aggregate income of all the roads represented in this State, was $31,350,512, against the $26,965,436 of last year; a gain of $4,385,706. The earnings from elevators are not included in either year. The earnings per mile of road were $5,594, against the $5,171 of the previous year. The earnings per mile of road in Wisconsin were $4,574, against $4,025 the preceding year. The earnings of the roads for the year were derived from the following sources: from passengers, $3,206,140; from freight, $9,332,752; from mails, express and all other sources, $654,559; earnings not classified, $462,125; which, after deducting $415,176 for the earnings of passenger roads, gives the total earnings as $13,240,400, against $11,486,954 in 1879, and a little over $10,000,000 in 1877. The average price per ton per mile, received in hauling freight on two principal roads in Wisconsin, is given in the following table, stated in cents and decimals of cents:

CHICAGO, MILWAUKEE & ST. PAUL.

Years.	Cents.	Years.	Cents.	Years.	Cents.	Years.	Cents.
1865	4.11	1869	3.10	1873	2.80	1877	2.06
1866	3.76	1870	2.82	1874	2.38	1878	1.80
1867	3.04	1871	2.54	1875	2.10	1879	1.66
1868	3.49	1872	2.43	1876	2.04	1880	1.72

CHICAGO & NORTH-WESTERN.

Years.	Cents.	Years.	Cents.	Years.	Cents.	Years.	Cents.
1870	3.09	1873	2.35	1876	1.91	1879	1.56
1871	2.87	1874	2.22	1877	1.81	1880	1.49
1872	2.61	1875	2.06	1878	1.63		

The longer the haul the less the freights are in proportion to the distance hauled; and so while the lines of roads have been greatly extended each year, the price received per ton hauled on freights carried the greater distance operates simply to decrease the average price received per ton per mile on the entire length of the road. There have been some marked reductions, however, in the price for the short hauls, and from the two causes combined the great decrease results. These figures apparently show a gradual reduction from year to year in prices per ton per mile charged for hauling freight. The whole number of persons employed in the operation of roads embraced in the report of the Railroad Commissioners of Wisconsin, is 23,212, against 18,379 reported the previous year.

Michigan is thoroughly intersected by roads that point to the pineries and even extend through the lower peninsula, and by the time this is in print, will bring Marquette, with its iron and the copper beyond it, into close rail connection with Detroit. The forty-eight railroad companies doing business in the State of Michigan, own a total of 5,358 miles of road, and operate 6,166 miles. Within the limits of the State there were, in 1879, 3,657 miles of road. The growth of railroads in this State can be seen from the following table:*

Years.	Miles of Roads.	Years.	Miles of Road.	Years.	Miles of Road.	Years.	Miles of Road.
1838	63	1849	353	1860	770	1871	2,298
1839	71	1850	380	1861	777	1872	2,822
1840	104	1851	421	1862	810	1873	3,252
1841	147	1852	425	1863	812	1874	3,313
1842	147	1853	425	1864	891	1875	3,347
1843	180	1854	425	1865	931	1876	3,410
1844	220	1855	462	1866	943	1877	3,455
1845	233	1856	530	1867	1,066	1878	3,564
1846	279	1857	579	1868	1,124	1879	3,657
1847	279	1858	709	1869	1,363	1880	3,981
1848	326	1859	770	1870	1,739		

The number of tons of freight handled by the different roads of Michigan during the year 1879, was 24,248,899; an increase of about 4,250,000 tons, or twenty-one per cent., over the preceding year. The average amount received for the handling of each ton, was $1.36; a reduction of .18$\frac{15}{100}$. The following table exhibits the class of freight handled and the per cent. which each formed:

Classes of Freight Carried.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Grain	11.54	15.15	14.57	15.97	18.64	24.49	23.15
Flour	4.61	3.98	5.53	5.71	6.15	6.43	5.85
Provisions	2.99	2.37	3.03	3.23	2.49	2.94	2.13
Animals	5.13	5.17	6.46	6.47	6.47	5.99	5.21
Other agricultural products	2.54	1.94	2.86	2.09	2.47	2.95	2.85
Lumber and forest products	16.13	17.17	19.31	18.78	18.93	17.09	17.55
Coal	6.80	6.61	7.25	7.03	6.74	5.15	6.00
Plaster			.52	.34	.59	.60	.45
Salt			.53	.38	.98	1.09	1.36
Petroleum			5.05	4.64	5.81	3.82	2.45
Railroad iron—rails			.31	.01	.19	.24	.31
Pig and bloom iron			.85	.77	.97	.69	1.05
Other iron and castings			1.37	1.38	1.22	1.19	1.13
Ores	12.38	9.77	8.35	7.74	7.03	6.49	6.00
Stone and brick	1.49	1.49	1.80	1.65	1.50	1.15	1.12
Manufactures	2.96	2.13	2.55	2.39	2.14	2.41	2.32
Merchandise and other articles not enumerated	29.72	29.54	19.08	19.44	17.08	16.75	18.44

* Report of State Commissioner.

The average rate of freight per ton per mile for the past six years has decreased as follows:

1874	$0.01.37	1877	$0.01.093
1875	.01.20	1878	.01.053
1876	.00.982	1879	.00.93

From the above it will be seen that the average rate for 1879 was less by $\frac{1}{10}$ of a mill than for 1876, when the rates were so low as to be a cause of surprise, and below which it was thought at that time our roads could not do business; but the experience of the past year has demonstrated that business can be done, when a sufficient volume is offered, at a less rate than a cent a ton per mile, and fair returns made to the owners of the property.

In Minnesota we find, besides important dependencies of the systems already noted, the great Northern Pacific, reaching already from Duluth, at the west end of Lake Superior, past the Missouri, and tending rapidly to the banks of the Columbia and the shores of the Pacific, through the wonderful wheat lands of the north border of our country, and penetrating the forests of the mountain rivers.

The total length of railroads in operation in Minnesota on the 1st of January, 1881, was 3,100 miles.* The total stock of lines of railroads in this State is reported at $57,778,144. The total debt was $48,391,388. The gross earnings of all the roads for the year ending June 30, 1879, were $8,047,834; the operating expenses, $5,106,422; net earnings, $2,941,412. For the year ending June 30, 1880, the gross earnings were $10,774,826; the operating expenses, $6,604,400, and the net earnings, $4,170,425. The movement of freight of all kinds in the reported year 1880, was 3,934,380 tons, against 2,893,940 tons in the reported year 1879, showing an increase of traffic of nearly one-third. The grain carried in the reported year 1880, was 1,056,859 tons. The number of passengers carried in the year ending June 30, 1880, was 1,934,406, against the number of 1,809,380 in the corresponding year 1879. The railroad lands sold in the year ending June 30, 1880, amounted to 506,951 acres, and the receipts on account of lands were $1,175,368; while for the corresponding year ending in 1879 the lands sold were 710,505 acres, and the receipts $3,040,130. In their last annual report the Commissioners say: "The tendency to lower rates for freight and

* This covers the miles of road assessed. Poor's Manual, for 1881, reports 3,141 miles.

passengers on the railroads of the State keeps pace in some degree with the increase of business. The alarming scarcity of fuel in the western and southwestern parts of the State was developed by an unusually early winter. Great complaint was made by the railroads on this account. The manifest causes were the large increase in population, and the increased demand for fuel, with the setting in of winter a month earlier than usual. Several mild winters just past had lulled the railroads and the people into a feeling of security that every day could be depended on for its own supply of fuel."

In Iowa one of the grandest matches ever made on any race course controlled by human energy is repeated daily. Five great trunk roads* dispatch their engines from the Mississippi to the Missouri—three of them† to meet at a common depot. Picking up each its share of the passengers, the mail and the freight of the long overland journey from California to the Missouri, they renew the race, back to the Mississippi.

In going eastward the Burlington & Missouri River road has to climb grades of sixty-nine feet to the mile for distances of seventeen and one-half miles, and with the return freights a similar grade for about thirteen miles. The five parallel trunk roads across the State, as will be seen from the table, have in some instances even steeper grades over which to transport freight, although the distance in no case reaches such high figures as in the one already named. The Chicago, Burlington & Quincy crosses the dividing ridge between the Mississippi and Missouri, 781 feet above low water at Burlington. The Rock Island road crosses the same ridge at Adair, 869 feet above low water at Davenport. The North-Western crosses at Arcadia, 868 feet above low water at Clinton. The Illinois Central, at Alta, is 924 feet above low water at Dubuque. The Chicago, Milwaukee & St. Paul, at Ruthven, is 810 feet above low water at McGregor. The highest ground in the State crossed by this road is west of the main divide, and between the Little Sioux and Floyd rivers, tributaries of the Missouri, 937 feet above low water at McGregor. The elevation of the dividing ridge between the rivers ranges from

* Chicago, Milwaukee & St. Paul, McGregor to Sioux City; Illinois Central, Dubuque to Sioux City; Chicago & North-Western, Clinton to Council Bluffs; Chicago, Rock Island & Pacific, Davenport to Council Bluffs; Burlington & Missouri River (Chicago, Burlington & Quincy), Burlington to Council Bluffs.

† Chicago & North-Western; Chicago, Rock Island & Pacific; Burlington & Missouri River (Chicago, Burlington & Quincy); at transfer depot of Union Pacific Railroad, opposite Omaha.

780 to 950 feet, or from 1,300 to 1,550 feet above the tide; the rise in the ridge between the extreme points being 275 feet. As you go north from Creston, on the Burlington & Missouri River, to Ruthven, on the Chicago, Milwaukee & St. Paul, you rise 275 feet. The southern three of the five roads crossing the State ascend gradually to the summit of the dividing ridge. The Illinois Central rises 525 feet within twenty-five miles of the Mississippi river, and the Chicago, Milwaukee & St. Paul rises 600 feet within fifteen miles of the river. Both these roads have a descending grade through the valley until they approach the Des Moines river, when they rise to a similar height. It will be observed in the table that the grade of the Mississippi river itself may be reckoned at an average of a little more than six inches a mile, as we pass from McGregor to Burlington, a distance by the river of about 230 miles, which needs to be borne in mind in the examination of the tables, as influencing the height to which locomotives must climb with their loads. Up grades exceeding five feet to the mile the five great roads crossing the State have each to draw their loads over one hundred miles, or about one-third of their length. At the other extreme it will be observed that the Chicago, Clinton, Dubuque & Minnesota reaches nowhere a grade of over forty feet to the mile, and does not have twenty-five miles with so much as five feet to the mile. The difference in the freight to be drawn by each ton of locomotive weight corresponds with this difference in grades.

The grade of the Sioux City & Pacific will be seen to be only fifty-three feet to the mile at its steepest elevation, and the drawing power of the locomotives on that road is nearly thirteen tons for each ton of locomotive weight, so that these two valley roads realize the highest freight power of locomotives, in striking contrast with the locomotive power of the Illinois Central in particular, and that of the five great roads that cross the State in general. The Illinois Central, with its excessive grade, is able to draw less than four tons of freight for each ton of locomotive weight, while the river road last mentioned draws seventeen and one-fourth tons for each ton of locomotive weight.

The cost to the roads themselves in moving freight, according to the grade of the roads, is shown in the following table, indicating the weight an engine can take on roads along the river valleys, compared with the weight it can draw on the roads over the divides in an east and west line:

Names of Railroads reporting net freight that can haul with an engine of given weight.	Weight of engine, in tons.	Net freight carried, in tons.	Net weight per ton weight of locomotive.
Burlington, Cedar Rapids & Northern	30	180	6.00
Burlington & Southwestern	30	170	5.66
Central Iowa	30	200	6.66
Burlington & Missouri River	36	180	5.00
Chicago, Clinton, Dubuque & Minnesota	33	570	17.27
Chicago, Milwaukee & St. Paul	30	180	6.00
Chicago, Rock Island & Pacific	35	180	5.14
Keokuk & Des Moines	32	220	6.90
Illinois Central, (in Iowa)	30	117	3.90
Kansas City, St. Joseph & Council Bluffs	32	400	12.50
Missouri, Iowa & Nebraska	33	240	7.28
Newton & Monroe	22	90	4.20
St. Louis, Ottumwa & Cedar Rapids	34	160	4.70
Sioux City & Pacific	28	360	12.86
Sioux City & Pembina	26	225	8.65
Crooked Creek	164	50	3.92
Des Moines & Minneapolis	14	100	7.14
Des Moines, Adel & Western	9	60	6.66
Waukon & Mississippi	14	100	7.14

GOING EAST AND SOUTH.

Names of Railroads.	Rise per mile of steepest grade. Feet.	Miles of level road.	Miles of road.	Net freight per ton of engine weight.
Chicago, Burlington & Quincy, main line	69	44.54	275.0	5.00
Chicago, Rock Island & Pacific, main line	74	73.22	317.0	5.14
Chicago & North-Western, main line	80	95.76	350.0	No report.
Illinois Central, main line	80	73.68	327.0	3.90
Chicago, Milwaukee & St. Paul, main line	74	.....	292.0	6.00
Burlington & Southwestern	69	52.84	118.0	5.66
Burlington, Cedar Rapids & Northern, main line	80	72.02	261.0	6.00
Central Iowa	74	17.81	189.0	6.66
Missouri, Iowa & Nebraska	69	.....	.....	7.28
Sioux City & Pacific	58	46.73	76.0	12.86
Chicago, Clinton, Dubuque & Minnesota	40	.....	139.6	17 27

GOING WEST AND NORTH.

Names of Railroads.	Rise per mile of steepest grade. Feet.	Miles of level road.	Miles of road.	Net freight per ton of engine weight.
Chicago, Burlington & Quincy, main line	69	44.64	275.0	5.00
Chicago, Rock Island & Pacific, main line	64	73.22	317.0	5.14
Chicago & North-Western, main line	80	95.76	350.0	No report.
Illinois Central, main line	85	73.68	327.0	3.90
Chicago, Milwaukee & St. Paul, main line	69	.....	292.0	6.00
Burlington & Southwestern	69	52.84	118.0	5.66
Burlington, Cedar Rapids & Northern, main line	69	72.02	261.0	6.00
Central Iowa	74	17.81	189.0	6.66
Missouri, Iowa & Nebraska	69	.....	.....	7.28
Sioux City & Pacific	53	46.73	76.0	12.86
Chicago, Clinton, Dubuque & Minnesota	40	.....	139.6	17.27

HIGHEST ELEVATION ABOVE MISSISSIPPI, AND TIDE.

Names of Railroads.	Steepest grade.		Miles of extreme grade.		Height reached above track at bank of Miss.	Height reached above tide water.
	Going east and south.	Going west and north.	Going east and south.	Going west and north.		
Chicago, Burlington & Quincy	80	80	17.41	12.65	781	1,977
Chicago, Rock Island & Pacific	74	64	.76	.38	917	1,613
Chicago & North-Western	80	80	.84	1.26	886	1,582
Illinois Central	50	65	1.37	.42	984	1,580
Chicago, Milwaukee & St. Paul	74	60	1.32	.19	849	1,471
Burlington & Southwestern	60	60	8.42	9.17	.....	.....
Burlington, Cedar Rapids & Northern	80	80	.06	.11	784	1,580
Central Iowa	74	74	.83	1.21	784	1,580
Missouri, Iowa & Nebraska	60	60	.32	1.10	.....	.....
Sioux City & Pacific	52	53	.47	.41	.....	.....
Chicago, Clinton, Dubuque & Minnesota	40	40	1.04	.41	.....	.....

The Mississippi river averages six inches to the mile, being 618 feet above the tide at McGregor, falling 122 feet to Burlington, about 220 miles.

In well-equipped broad gauge roads, the power per ton of locomotive with freight is represented in the table in ratio nearly corresponding to their difficulties of grade. In the narrow gauge roads, the weight of locomotives is usually higher in proportion than upon the broad gauge roads of a similar grade. This matter of grades is properly very fully discussed by the Railroad Commissioners of Iowa in their report for 1879, as an important element in the decision of freight charges, and indicating the greater difficulties which roads crossing squarely the dividing ridges between the rivers must overcome, as compared with the roads which follow the river valleys; and they suggest whether this may not modify somewhat the markets of the future products of Iowa. The course of the Commissioners of Iowa in investigating such points is of great value to the railroad interests of the country, and tends to inform farmers and the business public as to those elements which enter into the fitness of railroad charges, enabling them to use some discrimination with regard to what may be excessive in given cases. Another element developed by the same commission is in the economies of freights carried long distances. A very serious item of cost on short roads compared with long ones, and with partial loads compared with fully loaded trains, consists in the loss of time with cars standing idle and with the train hands only partially occupied, as against cars occupied in use and promptly unloaded, where the best facilities for loading and unloading are in use. The railroad company can afford to carry freight some miles farther for a less charge, if by so doing their cars are un-

loaded some hours sooner and thereby more promptly rendered available for use with other freight. This is not always borne in mind by the man who simply thinks of the short distance his freight has been carried, compared with that which some other person has had freight carried for an apparently cheaper rate. The cost of handling scattered and insufficient freights must always be largely more in proportion than the cost upon abundant freight already gathered in one locality or all to be discharged at one spot.

In November, 1879, there was a total mileage of 4,721 miles of railroad in the State of Iowa.* Some idea of the condition of the roads in this State, and the standard at which they are maintained, may be learned from the fact that at this time there was considerably over twelve hundred miles of steel track. There are about 750 stations in the State; the total number of persons directly employed by the roads is 15,391, while in working quarries, mining coal, building masonry, getting out timber and ties and contract work of various kinds, probably there is fifty per cent. more. Much of this labor is required for inter-State transportation. The Commissioners suggest that passenger trains might be run cheaper if the people of this country would be satisfied with the light and cheap cars of Europe. The railroads are hauling too much weight of car to the passenger, to run this business economically. The Commissioners' report shows that the total number of miles run by passenger trains during the year 1879 was 6,971,372; by freight trains, 18,505,590; mixed trains, 392,695; of construction trains, 146,948; making the total number of miles run, 27,091,664. The total number of passengers carried was 7,927,683; the total number of passengers carried one mile, 330,408,980. The total number of tons of freight carried, 8,553,311; the total number of tons carried one mile, 2,790,826,910. Of the tonnage carried, thirty-one per cent. was grain, four per cent. flour, three per cent. provisions, ten per cent. animals, three per cent. iron and steel, fifteen per cent. lumber and forest products, eleven per cent. coal, twenty-three per cent. merchandise and articles not enumerated. The Burlington & Missouri River Railroad has received from land grants, 360,072 acres. The land sold and contracted up to June 30, 1879, brought $2,425,203. The company has paid in taxes on the land, $170,885, and expended in management and sale, $427,978.

* Increased in 1880 to 5,[illegible] miles.

The Chicago, Milwaukee & St. Paul road received from grants, 2,816 acres; from undisputed grants, 185,462, and from lands in the overlapping grants claimed by the Sioux City, Chicago & St. Paul, 90,000 acres. The Chicago, Rock Island & Pacific road received from grants, 550,193 acres. The number of acres sold was 272,233. The amount received from sales, including bills receivable, was $2,100,371; taxes paid, $498,193; expended for sale and management of lands (extended), $152,551; for the Sioux City & Pacific road the number of acres received was 320,009; the number of acres sold, 132,115; the number of acres claimed as overlapping with the Milwaukee & St. Paul road grants, 87,164; the gross amount received from lands sold was $742,148. There is a great tendency in Iowa toward consolidating with these various lines roads that might serve as competitors or feeders.

Missouri has her great series of railroads: a road from Hannibal to St. Joseph, now identified with the Chicago, Burlington & Quincy; the road to Kansas City from St. Louis; the road from St. Louis through the mineral lands and fine farms of Southwest Missouri to the Indian Territory; the Iron Mountain road, reaching southward; and all these so extended by their close business relations as to put Kansas and Texas, Arkansas and the remote South directly in communication with St. Louis. At the close of 1879, there were within the State of Missouri, according to the annual report of the Railroad Commissioners, 3,616 miles of road. Add to this the parts of the same lines extending into other States, and the total length of what may be called Missouri railroads was 5,251 miles. At the close of 1880, the total length of miles of road within the limits of the State was 4,011,* of which 1,985 miles are laid with steel rails. At the close of 1880, there were seventy-three lines owned or leased in perpetuity by forty corporations, and operated by twenty-five companies. There are 114 counties in the State. At the close of 1880, there were only twenty-one counties without railroads, all of which were in the south half of the State. It is estimated that at the close of 1880, the State had sixteen and one-third square miles of area and 542 inhabitants to the mile of railroad. In the northern part of the State there are not exceeding twelve square miles of area and 400 inhabitants to the mile of road. The liabilities of eight companies, owning 4,705 miles of road, are: total stock account, $140,983,662; bonded debt,

* Stated by another authority at 4,000.

$120,638,297; total stock and debt, $261,571,959; average amount of stock per mile, $29,954; debt per mile, $25,640; average amount of stock and debt per mile, $55,594.

In Kansas there were 3,104 miles of road assessed for 1880;* of which the Atchison, Topeka & Santa Fé has 470 miles, the Union Pacific, Kansas Division, has 477 miles, and the rest is divided among some forty different corporations, of which six operate from 100 to 190 miles each, and the rest, to a great extent, are controlled and even operated by the leading lines. Atchison and Kansas City are the starting points for a large number of these roads. Two great railway lines reach through Kansas, from east to west: the Kansas Pacific, now controlled by the Union Pacific, reaching from Kansas City to Denver, Col., and the Atchison, Topeka & Santa Fé, from Atchison to Santa Fé, N. M. Each of these roads appears in the table of land grant roads. The eastern part of Kansas is crossed and recrossed thickly with railroad tracks, and at least three tracks reach to the borders of the Indian Territory, only one of which yet has permission to cross the boundary. Nowhere in the Union is the sharp competition of the great markets, and of the transportation lines they push out to draw trade to themselves, more manifest than in the rich eastern counties of Kansas. Through these counties, too, must come, on the execution of treaties that open tracks across the Indian Territory, a zealous competition for the traffic of Texas, now reached but by a single track that does joint service for Kansas and Missouri roads.

Elsewhere I have indicated what are the principal trunk lines west of the Missouri, either under what I have had to say of roads from more eastern points, or in treating of the policy of the government toward public improvements. A table of land grants for railroads will be found to contain the names of the important roads whose history differs from roads in the older parts of the country, in that these were built in anticipation of settlement and business, while the older roads grew by pressure of business. But for the land grants, the construction of these lines would have been long delayed.

California had, on the 1st of January, 1879, 1,944 miles of broad gauge railroad, of which the greater portion was controlled by the Central Pacific and the Southern Pacific. The latter road has now completed connections so that, running southward

* At the end of the year there were 3,485.50 miles.

from San Francisco, one goes out at the extreme southeast corner of the State, across Arizona, and, turning northward in New Mexico, reaches the Atchison, Topeka & Santa Fé road at Albuquerque. California is a vast State, with a comparatively small population, and the local business of her railroads is proportionally costly. The system of navigable streams aids transportation in that portion of the State along the great San Francisco Bay, and in the valleys of the Sacramento and the San Joaquin rivers. Roads are pushing toward Oregon and off toward the mountain mines, but the Pacific coast presents a steep and abrupt ascent toward the interior compared with that from the Atlantic side, and the development of local roads is correspondingly more difficult. The work upon the Central Pacific involved some of the grandest feats of modern engineering, to take a track down the abrupt descent, from a height so gradually climbed from the Mississippi valley. Without the land grant system, California might not have had communication, even yet, direct with the Atlantic slope. Her railroad system depended on that for the resources which, it is recognized, could not have repaid private enterprise for a long period. Yet her officials are not altogether satisfied that a government subsidy is good policy. They feel that it puts too much at the control of great corporations, without being quite satisfied that theirs was not an exceptional case, and one not to be taken as a precedent for government policy.

It would require many a page even to enumerate the enterprises of private capital that, besides governmental aid, have made the denser settled portions of the West a complete network of railways, and have made the steam engine the burden bearer for the pioneer to new lands. Nor shall I here enter upon a discussion of the tendency of great corporations to encroach upon public rights. It may be pertinent to inquire whether the force of events is not tending to make extortion and injustice impossible, to such an extent that the work of great railroad companies must be a gain to the communities they serve. Edward Atkinson has indicated, in an article in the *Fortnightly Review*, that the cheap transportation of the barrel of flour and the barrel of pork, or their equivalents in other food, which the Eastern laborer or even the English laborer must have, enables him to busy himself with other labor, while the distant pioneer farmer gets a better price for his product and

buys his clothing and his farm implements cheaper than would be the case if the manufacturer and the farmer were compelled to live close to one another in their mutual dependence. Many persons still live within a hundred miles of the greatest grain market of the world in ancient or in modern times, who recount to their children how they hauled wheat to Chicago with their teams, camped at night by the wayside, and, after a week or so spent in going and coming, reached home with a few yards of calico, or a few pounds of groceries, as the net proceeds of the journey. Politicians have found that democracies are not wholly free, and that despotisms are not wholly arbitrary. The Oriental monarch or modern railway king is held by an inexorable force, inflexible as the law of the Medes and Persians, that not Darius, ruler of a hundred and twenty provinces, could revoke to take his friend out of the lion's den. As Mr. Atkinson pertinently asks, had Mr. Vanderbilt set out to save England from distress from riots and bloodshed in the railroad consolidations that enabled a barrel of flour to be carried from Chicago to New York for half a dollar instead of three times as much, how would he have been estimated? Yet this is just what Mr. Atkinson esteems as the result of the money-making schemes of the railway kings. The railroads have brought the grainfields and the pastures of the West to the doors of the factories of the East. They have stimulated the finer farming of the East, too, it must be remembered, so that while La Salle county, Illinois, with its prolific cornfields and its fat animals, was fifth in agricultural products in the United States, Lancaster county, Pennsylvania, that could mainly dismiss the cultivation of staple food and devote itself to raising more especially the perishable articles that are needed in the daily market of the adjacent cities, was first; Lawrence county, New York, supplying milk and dairy products to the great masses of people who must have them fresh, comes second; and Worcester county, in old Massachusetts, a State popularly supposed to have little agricultural position, is third of all the counties of the United States in agricultural products. The cities and the factory towns of Massachusetts buy eagerly every relishing fruit and every staple vegetable that can be coaxed out of the ground, even if the great supplies of meat and bread come from the fertile West. The fourth county in agricultural products is in New England, which, for reasons similar to those which make Worcester third, is Hartford county, Con-

necticut. Sixth, was Oakland county, Michigan; and seventh, Burlington county, New Jersey. Mr. Atkinson reminds us that the five counties of the East had farms valued at $182,786,611, in 1870, for which year all these ratios are taken, while all the farms of Illinois were only rated at five times as much, and all in Minnesota at one-half as much. The growth of cities in the Western States, and the increase of manufactures in them, have modified somewhat the condition at the West; but the States east of the Mississippi, and the newer West, have, to some extent, the same philosophy of future farming and manufacture before them. We shall have cheap lands, pioneer farming and gross products—we shall have skilled labor, high farming, perishable products, and the railroad will equalize the advantages of them all, so that the laborer in the factory will have cheap food, and the plowman in the Red River country, or the herdsman on Colorado ranges, will have comfortable clothing and shelter.

The modification of mining rendered possible by railroads is a prominent point with Mr. Atkinson. Without the railroads, only straggling adventurers could be sustained where Denver and Leadville stand, and the Comstock lode could never have contributed its millions to the world's wealth. Quoting from Cernuschi, he gives, money issued by mines, mountains and rivers, in twenty-seven years, as—gold, $2,990,660,200; silver, $1,410,327,600; or a total of $4,400,987,800; a vast part of which comes by the opportunity opened by the railroads. In this mining region of the mountain States high farming is also stimulated, as in the manufacturing district of the East; only here the laborer is mainly the miner, who can not stop to raise his food. Irrigation, where practicable, is the key to the farm gardening of this region.

I am able to avail myself of the summaries of Joseph Nimmo, Jr., Chief of the Bureau of Statistics, upon "The Railroad Problem,"* and upon "Competition in Transportation." Mr. Nimmo deals with roads mainly lying east of the region to which this volume is devoted, yet the fundamental question in his investigations is identical with the vital interests of Western men, being the problem of movement of commodities between the West and the seaboard. In a group of important roads which he specifies, freights increased from 45,557,002 tons in 1873 to

* The Railroad Problem, October, 1881.

78,150,913 tons during 1880, or about 71.5 per cent. In the same period the growth of receipts was from $112,004,648 to $143,388,178, or only about 28 per cent. The average rate per ton per mile had fallen from $1.77 to $1.07, or 39.5 per cent. This modification of rates is chiefly manifest in commodities commonly known as necessaries of life. The exports of the country grew from $442,820,178, in the year ending June 30, 1871, to $902,319,473 in the year ending June 30, 1881, largely through the advantages of cheapened freight to agricultural, mining, and commercial interests. Such reductions have not been a voluntary matter with the companies, but have been brought about in part through the greater economy with which they are able to do business, partly by competition of railroads with each other and with waterways. The great questions of railway management are yet in an unsatisfactory state to all parties. Meantime the tendencies are to cheaper rates for the people. While managers are extremely troubled in adjusting remunerative rates at competing points so as still to hold business already in their control elsewhere, and are themselves much at the mercy of subordinate agents, struggling in solicitation of freights, great economies in administration redonnd to the public advantage. With all their competitions, the railroads of the country constitute, for many purposes, but a single system, most of them having the same gauge, so that they can take each other's loaded cars without breaking the loads. The emigrant from New England can fill a car with his household goods and have no drayage, storage or handling charges to pay until it reaches Texas or Nebraska. The miller in St. Louis, by loading full cars, can send a barrel of flour to New York for no more than the New York citizen within a mile of the depot pays to get a single barrel carted to his home. A car takes furniture without drayage at the door of a Western factory, and leaves it, without other than the care of hauling, at the door of a New York furniture establishment. The special labor of delivering a single bureau in the next block is more than the railroad companies are now compelled to use on whole trains full of goods from one ocean to the other.

Mr. Nimmo deals at length with the question of pools, and of the need of national legislation to adjust questions that have outgrown the grasp of individual corporations or of State authorities. While 'pools,' (that is, agreements between competing roads, for ratios of income or of freights), have some ultimately unfavor-

able aspects, they work, Mr. Nimmo seems to think, immediate advantage in steadiness of rates, saving local business from violent fluctuations through spasmodic freight charges; yet the roads themselves have not been able to make pools trustworthy for their own interests, and the patrons, the stockholders and the managers have yet need of some more comprehensive plan, for which Mr. Nimmo looks to national legislation. He points out that the pool itself opens an economy to roads that can adjust their trains to use less men and less cars with less charge to the public than when contending for the freights.

A war of rates in unlimited competition means loss to stockholders, uncertainty as to rates from day to day, and detriment to the commerce and the productive interests of the country.*

The fluctuations of railroad business and incomes, with the ultimate issues which must be met, will be of less interest just now to readers than some of the great and permanent influences that I proceed to notice.

Water competition is of great importance in regulating freights.† Two great water lines connect the food-growing West with the seaboard—one the lakes and the canals; the other the Mississippi river. Half of the year frost binds up the lake route.

Mr. Nimmo regards a competition of commercial forces as more important than competition of routes. A strong community of intelligent merchants, and a capital at command large enough to execute their plans, are the two elements he deems essential. I have, in the chapter on Cities, discussed the native and social forces that determine points for the crystallization of such controlling trade centres in a way that is essentially harmonious with Mr. Nimmo's view, although approaching the subject from another side. Milwaukee, Chicago, St. Louis, Peoria, Toledo, and Detroit, are the interior points which he specifies as strong enough to arrest the surplus products of the West on the way eastward long enough to take an option whether to go by water or by rail. Through commercial points of less importance the trains go thundering on, right over the very waterways, as across thirteen bridges over the Mississippi between St. Paul and

* The Railroad Problem, Joseph Nimmo, Jr., p. 28. The 'war of rates' would in one year cost the railroad incomes $13,940,000, representing a sudden disturbance, in one class of property, of 6 per cent. on $209,130,000, as quoted from Pres. J. W. Garrett, Pres. Baltimore & Ohio R. R.

† Competition in Transportation, Joseph Nimmo, Jr., Washington, Government Printing Office, 1881.

St. Louis, without perceptible change of rates. The really potential influence of the choice between water and rail freights centres mainly at Milwaukee, Chicago, and St. Louis. The influence of the seven primary markets, adding Duluth to the six already named, is shown in the fact, that, of 400,000,000 bushels of grain sent east and south about 320,000,000, or 80 per cent., was first sold in those cities, and only 80,000,000 bushels were shipped direct to the Atlantic seaboard. St. Louis received in 1880, in grain, 47,697,066 bushels; 84 per cent. by railroad, and only 16 per cent. by river. Chicago received in 1880, in grain, 165,855,370 bushels; 96 per cent. by rail, and only 4 per cent. by lake and the Illinois Canal. From Chicago 61 per cent. of flour and grain were shipped, and only 10 per cent. of provisions went forward by lake, and no live stock. From St. Louis 49 per cent. of grain, 38 per cent. of provisions, and 28 per cent. of cattle forwarded, went by the river. Although but a few points have direct opportunity to choose between water and rail routes, these points indirectly influence freights from the whole West, and, as will appear, the influence of circumstances at St. Louis makes that a focus of influence on freights between the West and the seaboard far out of proportion to the relative figures of her commercial transactions. The lake water route from Chicago to New York is about 1,400 miles, and to Montreal about 1,260; while, disregarding lesser windings of the river, it is not 1,400 miles from St. Paul to New Orleans, and not 800 from St. Louis to New Orleans. The coastwise charges prevent the river route from being a factor in shipping grain for consumption in the east of our own country, but ocean shipment is reached at New Orleans for European markets. The influence of rail and water rates on each other is reciprocal; each tends to regulate the other. A recent example is given in the Chicago current news. Vessel owners were offered the carrying of an immense quantity of grain at rates which they refused, demanding a higher rate, pending which the railroad offered to transport it at rates below the first offer to the vessels, which were left idle. A table compiled by Mr. Nimmo* shows that all rail transportation in 1880—that is 18.3 cents a bushel—was but little over two-thirds the charge—26.6 cents a bushel—by lake and Erie Canal in 1872. In 1880 the lake and canal charges had been reduced to 13.2 cents a bushel. In 1881, during the 'war of rates,' grain has been carried by 'all rail' for 7.2 cents a

* Competition in Transportation, p. 12.

bushel, and by lake and canal for 6.5 cents a bushel, possibly without remuneration to the carrier.*

The extension of railroads beyond the Mississippi has tended to divert trade from the river, and to modify freights upon it. For all this influence St. Louis is a focal point. The price of a bushel of grain at a railway station in Central Iowa may be some cents better for the farmer who sells it to go to Eastern markets by other routes, when the river freights from St. Louis make it desirable to send it that way, unless charges by other routes are correspondingly modified. In this view, the improvement of the mouth of the river, and the question of the ultimate success of the jetties, become no local questions but questions of direct importance to every Western producer, and only in less degree to every Eastern consumer. Ice has obstructed the river below St. Louis in the last sixteen years for different periods, from no days in the winters of 1868–9, 1873–4, 1875–6, and 1877–8, to seventy days, in the remarkable winter of 1880–1.

The stage of water is very important, since when it is eight feet grain is transported at less than half the cost at four feet. In nine years, from 1865 to 1873, there was less than four feet below St. Louis for less than an average of three and a half days a year, but less than eight feet for an average of about half the year.† Whereas, before the recent improvements, the channel at the mouth of the Mississippi had become reduced to sixteen feet, since the completion of the jetties it is twenty-nine feet; while towage from the mouth to New Orleans is less than half as much per ton as in 1875, and insurance charges have been reduced. The average time for which navigation has been suspended by ice at St. Louis in the last ten seasons is but thirty-five days; and the average time during which barges could not be loaded to eight feet on account of ice and low water, from 1874 to 1880 inclusive, was but about one hundred and twenty-six days annually. On the canal waterway ice closes navigation about five months each year. With the growth of commercial power at St. Louis, the ice and the low water produce less effect than formerly. Increased storage at the interior markets, and growing ability to wait for favorable transportation, give stability to prices in times of temporary obstruction.

* Competition in Transportation, p. 13.

† Mississippi steamers of 2,000 tons burden seldom require even seven feet.

	Tons.
In 1880, the east and west trunk lines received from the West, merchandise*	11,500,000
St. Louis shipped east	1,325,004
" " south, by rail and river	1,492,216
" " " by river	820,555
New Orleans exported western and northwestern products in year, to June 20, 1880	317,000

The exportation from New Orleans was but 38.6 per cent. of the freight sent by river south from St. Louis; but 21.2 per cent. of that sent south from St. Louis by both water and rail; but 23.9 per cent. of the shipments from St. Louis east, and but 2.8 per cent. of the total received by the Eastern trunk roads from the West.

The following table† shows grain, not including flour, shipped east and south from St. Louis each year from 1871 to 1880 inclusive:

Year.	East.	South.	
	By Rail.	By River.	By Rail.
	Bushels.	Bushels.	Bushels.
1871	2,154,065	4,565,973	1,323,457
1872	3,456,409	6,618,757	2,194,019
1873	2,065,660	5,920,687	1,874,386
1874	2,318,350	5,344,534	1,683,478
1875	2,658,478	3,260,085	1,871,023
1876	12,434,296	4,212,435	995,540
1877	6,570,529	5,691,493	1,378,982
1878	7,561,475	7,280,423	1,054,221
1879	8,227,465	8,596,953	1,360,096
1880	8,790,059	18,978,347	2,646,714

The establishment of barge lines I have spoken of elsewhere. The growth of the New Orleans grain trade is a direct record of that outlet for Western grain for ten years.

The following figures‡ show exports of grain and flour at New Orleans—flour counted at four and a half bushels and meal at four bushels a barrel: Year ending June 30, 1871, 1,297,989 bushels; 1872, 1,231,794 bushels; 1873, 1,214,588 bushels; 1874, 2,305,060 bushels; 1875, 795,159 bushels; 1876, 1,967,980 bushels; 1877, 3,227,049 bushels; 1878, 7,238,665 bushels; 1879, 6,308,404 bushels; 1880, 12,278,778 bushels.

Wheat could be sent from St. Louis, by rail to New York, thence to Liverpool, on opening of navigation in 1881, for about

* Quoted by Mr. Nimmo, from Mr. Albert Fink, R. R. Com., in letter, *New York World*, under date of March 8, 1881.

† Competition in Transportation, p. 88. ‡ *Id.*, p. 33.

35 cents per bushel, and by New Orleans for 26¼. On the 31st of May, rates to Liverpool by New York were 30 cents and by New Orleans 18¼ cents. In the later "war of rates" the ratios were somewhat disturbed.

If, however, the railroads make their transportation from St. Louis as low as the river rates, it would divert a great part of the freight now put in their hands at other points to St. Louis to get cheap freight thence. The roads find an economy, therefore, in moderating their charges from other interior markets to the East, while they leave the bulk of St. Louis grain transportation to the river. In the great working of economic commerce, the producer gets his share, for the saving in transportation in part increases the price to go to the producer.

As Mr. Nimmo remarks, the reduction in cost of transportation by the Mississippi river appears likely to exert a most salutary regulating influence over rates charged by east and west trunk lines at all the primary markets of the West—an influence in a high degree favorable to the agricultural interests of the Western and Northwestern States.

RAILROADS AND THE FARMERS.

At the Minnesota State Fair, Col. William F. Vilas said:

"Before railroads were devised, there was no extensive freight communication except by water. And that was valueless unless conveniently accessible. Owing to this the agriculture of past ages gathered around the seas and lakes, or lined the river's margin. It girt the Mediterranean, and made famous the valley of the Nile. The unwatered world of the interior was left to the wandering nomad or to the forest barbarian. It was the unknown region, full of mysterious terror. The great Hercynian wood was the home of beasts, brute and human—the latter the ever impending peril, and finally the destroyer of the civilization of the world. The reserve corps of barbarism lay back in the plains of Russia and Tartary, which nourished the fierce savages who could live on equine flesh and carouse on the milk of mares. So, too, water communication was slow and tedious, even when accessible. That is true especially of inland navigation. It is weeks by water from St. Paul to New York, though the aid of steam be invoked; and in northern climes that avenue is available for but half the year. Your magnificent wheat fields would mostly lie unbroken, farmers of Minnesota,

had not the invention and enterprise of other men, stimulated by your demand, laid the double lined highway to carry the freight car, laden with your precious berry, to the sea; the Indian would still be master of the Territories of the West. Your land derives its value, your industry its reward, your homes the luxuries and many of the comforts they exhibit, from the railroads of the continent.

"In the beautiful language of that noble lover of human liberty, once the pride and ornament of Wisconsin's supreme bench, the lamented Byron Paine, 'Railroads are the great public highways of the world, along which its gigantic currents of trade and travel continually pour—highways, compared with which the most magnificent highways of antiquity dwindle into insignificance. They are the most marvelous invention of modern times. They have done more to develop the wealth and resources, to stimulate the industry, to reward the labor, and to promote the general comfort and prosperity of the country, than any other, and perhaps than all other, mere physical causes combined. There is probably not a man, woman or child whose interest and comfort has not been in some degree subserved by them. They bring to our doors the productions of the earth. They enable us to anticipate and protract the seasons. They enable the inhabitants in each clime to enjoy the pleasures and luxuries of all. They scatter the productions of the press and literature broadcast through the country, with amazing rapidity. There is scarcely a want, wish, or aspiration of the human heart which they do not in some measure help to gratify. They promote the pleasures of social life and of friendship; they bring the skilled physician swiftly from a distance to attend the sick and the wounded, and enable his friend to be present at the bedside of the dying. They have more than realized the fabulous conception of the Eastern imagination, which pictured the genii as transporting inhabited palaces through the air. They take a train of inhabited palaces from the Atlantic coast, and with marvelous swiftness deposit it on the shores that are washed by the Pacific seas. In war they transport armies and supplies of the Government with the utmost celerity, and carry forward, as it were on the wings of the wind, relief and comfort to those who are stretched bleeding and wounded on the field of battle.'

"But while we do them justice, let us not forget that there

are doubtless many faults to be corrected and abuses to be reformed in the administration of these highways. Corporate powers and corporate values have advanced with a more rapid step than the invention of our statesmen and law makers. The agency of the corporation is comparatively modern, and, like the agency of steam, is a mighty power. Unless subdued by proper appliances of law, sufficient to control it, we are liable to disasters injurious to our welfare, as the accidents which sometimes befall the train are destructive of life.

"But I must not protract this weary hour to discuss this problem, foreign to my subject. Important as it is, we need not fear it. The railroad, rightly used, is the friend of the farmer and of the whole people. It is the paramount interest of its owners that it should so remain. They dare not make it an enemy; and when we reflect that a single invention—the steel rail—has reduced the freight tariff 40 per cent., we may trust somewhat to time and genius to relieve its objectionable features, while we continue to enjoy its blessings with composure."

U. S. LAND SURVEY AND LAND GRANTS.

The map at the opening of this chapter presents a comprehensive view of the land grants of the General Government in aid of railroads. With the help of the explanations here given, and the table of land grants for railroad purposes, most of the grants can be readily identified. In Iowa, Southern Minnesota, Northwestern Wisconsin, Eastern Nebraska, and Kansas, such grants absorbed most of the public land, while broad bands of grant land stretch to the Pacific, and cover portions of several States to the east and south of those named. The map was originally published by the Government in "Powell's Arid Regions."

At the close of the Revolutionary war the United States controlled the country east of the Mississippi and north of Florida. That portion west of the original States was claimed as under various jurisdictions, the claims being based on colonial charters. One of the early steps in the organization of an independent government was the transfer of these separate and sometimes conflicting claims to the general government, with some specified reservations — Connecticut retaining a tract elsewhere referred to in Northeastern Ohio, and Virginia reserving lands for bounties to her soldiers. The State of Connecticut surveyed her

reserve into townships of five miles square, duly subdivided. In the original States no general system of surveys prevailed. For the most part a selection of lands was at first determined by some advantage of location along a stream or otherwise, which being established made part of the boundary lines of the next adjacent selection. All the new lands from Western Ohio to the Pacific are either laid out in regular form between north and south and east and west lines, or will be brought into such survey as needed for various purposes. The convergence of north and south lines toward the north disturbs the rectangular form of the divisions, and provision is made for corrections and allowances by which the plan may be retained as a basis of description. A few lines are surveyed with great care, from which to make a beginning, for considerable tracts of country, known as principal meridians. East and west lines of a similar use are run, known as base lines.* From the adoption of the rectangular system of surveys, May 20, 1785, to June 30, 1875, twenty-four initial points, or the intersection of the principal base lines with surveying meridians, were brought into use to define public lands with certainty and brevity. From the principal bases townships six miles square are run out and established, with regular series of numbers counting north and south from the bases, and from the meridians a like series of ranges, numbered east and west of the principal meridians. In those ninety years the following numerical and independent principal meridians and bases were established:

The First Principal Meridian, starting from the confluence of the great Miami and the Ohio, has the Ohio river for its base, forms the dividing line between Ohio and Indiana, and coincides with 84° 51′ west of Greenwich. It governs the survey of public lands in the State of Ohio.

The Second Principal Meridian starts from a point two and a half miles west of the confluence of the Little Blue and the Ohio, runs north through Indiana, and governs surveys in Indiana and part of Illinois, coinciding with longitude 86° 28′ west.

The Third starts from the mouth of the Ohio, extends to the northern boundary of Illinois, and governs surveys in Illinois to the *east* of it, except those projected from the second, and on the *west* to the Illinois river. It is 89° 10′ 30″ west longitude.

The Fourth begins in the middle of the channel of the mouth

* Report Commissioner of Land Office, 1875.

of the Illinois river, latitude 38° 58′ 12″ north, longitude 90° 29′ 56″ west, and governs surveys in Illinois west of the Illinois river and west of that part of the third principal meridian north of the Illinois river, and extends north to govern surveys in Wisconsin and in part of Northeastern Minnesota.

The Fifth begins at the mouth of the Arkansas, using a base line due west from the mouth of the St. Francis, and governs the surveys in Arkansas, Missouri, Iowa, Minnesota west of the Mississippi, and Dakota east of the Missouri. It is 90° 58′ west.

The Sixth is 97° 22′ west longitude, having the 40th degree north latitude as a base, extends south to latitude 37° and north to the Missouri, and controls the surveys in Kansas, Nebraska, Dakota south and west of the Missouri, Wyoming, and Colorado, except a portion along the Rio Grande del Norte, surveyed from the New Mexico meridian.

There are these unnumbered meridians:

The Michigan Meridian, 89° 19′ 9″ west, with a base line seven miles north of Detroit, governing surveys in Michigan.

The Tallahassee, St. Stephen's, Huntsville, Choctaw, Washington (Mississippi), St. Helena, and Louisiana meridians, in Southern States, not pertaining to this book.

The New Mexico Meridian, longitude 106° 52′ 9″ west, meeting its base line on latitude 34° 19′ at the Rio Grande del Norte, controls surveys of New Mexico and the valley of the Rio Grande del Norte, in Colorado.

The Great Salt Lake Meridian, 110° 53′ 47″ west, intersects the base line 40° 46′ 4″ north, at the corner of Temple Block, in Salt Lake City, and governs surveys in Utah.

The Boisé meridian, longitude 116° 20′ west, meets its base between the Snake and Boisé rivers, latitude 43° 26′ north. The initial monument marking the intersection is nineteen miles southwest of Boisé City. This governs surveys in Idaho.

The Mount Diablo Meridian, 121° 54′ west, intersects a base line on the summit of the mountain which gives it its name, latitude 37° 53′ north, governing surveys of Central and Northeastern California and all in Nevada.

The San Bernardino Meridian, 116° 56′ west, intersects the base line 34° 6′ north latitude, on Mount San Bernardino, and governs part of the surveys in Southern California.

The Humboldt Meridian, longitude 124° 11′ west, meets its base on Mount Pierce, latitude 40° 25′ 30″ north, controling surveys in Northwest California.

The Willamette Meridian coincides with 122° 44′ west longitude, with a base line on the parallel of 45° 30′ north latitude, and controls surveys in Oregon and Washington.

The Montana Meridian extends north and south from the initial monument on a limestone hill 800 feet high, longitude 111° 40′ 54″ west, at which point also the base line crosses in latitude 45° 46′ 27″ north. Montana surveys are governed by this meridian.

The Gila and Salt River Meridian intersects the base line at the Gila river, opposite the mouth of Salt river, longitude 112° 15′ 46″ west, latitude 33° 22′ 57″ north, and governs surveys in Arizona.

The Indian Meridian intersects its base at Fort Arbuckle, Indian Territory, longitude 97° 15′ 56″ west, latitude 34° 31′ north, and governs surveys in that Territory.

A Western man knows his land by its description referred to in this system of lines. In fact, the township of six miles square, marked out in such intersections, becomes at once a *quasi* municipal unit, ready to control a designated portion of land for the benefit of schools, and to form school organizations. The intending purchaser of a tract in Illinois described as in Township 40 North, Range 1 East of the Third Principal Meridian, could approximate its position by a section map, on which he could find the third meridian as I have located it. He would take each row of townships north and south as a range; the map itself would indicate the various base lines and the direction in which to count from them. The base line for Illinois east of the third meridian is nearly opposite St. Louis; so that the description given would locate the land within six miles east of a straight line north of the mouth of the Ohio, and the forty townships of six miles breadth would take him 240 miles north of the location of base line, almost directly west of Chicago, in the beautiful valley of the Rock river. The township being identified, its subdivisions of one mile square, known as sections, would be found marked at the corners, and indicated on maps by a system of numbers running from one to thirty-six, uniformly following the same order from the northeast corner to the northwest corner; then back and forth, ending with thirty-six in the southeast corner, as in the diagram. The system of subdivision is carried to such an extent that he can buy a plot as small as forty acres, which will be made over to him as the

quarter of a quarter of a section of the township with some such abbreviations as this possibly: "The S. E. qr. of the N. E. qr. of Sec. 30, Tp. 40 N., R. 1 E. of the Third Principal Meridian."

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Even after dense population and strong municipalities are upon the lands, these descriptions remain the basis of transfers, and the original township lives in the school system.

In opening the lands to private ownership, the general government began with the policy of setting apart lands to support religion and to support schools. The first was abandoned, however, so early that no State except Ohio was affected by the provision, and only portions of Ohio. The sixteenth section in each township was reserved for the benefit of schools in the new States until 1848;* since which time the thirty-sixth section also has been donated for schools. I have elsewhere indicated the difference, in a railroad grant, between receiving the even numbered and the odd numbered sections. The sixteenth, and lately the thirty-sixth, section of every township was already appropriated for Territorial or State school systems.

The first act making a donation in favor of internal improvements was approved on the 30th of April, 1802. It granted one-twentieth of the net proceeds of all lands sold by Congress after the following June 30th to the State of Ohio, and was to be applied to laying out and making public roads to the Ohio river, to the State of Ohio, and through Ohio, from the navigable waters emptying into the Atlantic. In 1803, a law was passed directing the Secretary of the Treasury to pay to persons to be designated by the Legislature of Ohio, three per cent. of the net proceeds as above, to be applied to making roads within the State. Similar acts were passed up to 1824. In May of

* Hon. Stephen A. Douglas secured the incorporation of a grant of the 36th section for school purposes in the bill for the organization of Oregon Territory, in 1848, but California, in 1853, was the first State to get this section conveyed to it. Seven States and the Territories are now entitled to it.

that year, the State of Indiana was authorized to open a canal; and the right of way, with 90 feet of land on each side thereof, was granted. Before work was begun, two acts of wider scope granted lands to Indiana and Illinois respectively, the first to connect the Wabash river and Lake Erie, the second to connect the Illinois river and Lake Michigan. Land equal to the alternate sections for five sections each side the canals, was granted. The canals were to remain public highways for the use of the government, and conditions were imposed as to the beginning and the completion of the work. At the same time a certain strip of land, or the proceeds of the sale thereof, was granted to Indiana, to be applied to building a road from Lake Michigan via Indianapolis to the Ohio river. On the following day an act was approved, granting Ohio one-half of two sections along a road to be constructed from Sandusky to Columbus. The first act looking to the construction of railroads by land donations was an act of March, 1833, authorizing Illinois to use the grant already made for a canal, in the construction of a railroad. However the canal was built. In 1846 a grant was made to the Territory of Iowa to improve the Des Moines river from its mouth to the mouth of Raccoon fork, donating one-half the land for five miles each side the river to aid in improving its navigation. An act passed the same day gave to Wisconsin, then almost through the legal steps in becoming a State, a quantity of land equal to one-half of three sections, along the Fox river, and the line of a canal to join the Fox and the Wisconsin, for the improvement of navigation on these rivers. The land reserved by the United States was in this first instance to have its minimum price doubled, or set at $2.50 an acre. Various details were embodied in both these bills, which I will not expand here. The Des Moines grant attracted great attention from the disputes that arose, and the decisions and the counter decisions of the departments at Washington as to its application. The final result of the discussions was the extension of the grant to the northern boundary of the State, and the application of part of the proceeds, by consent of Congress in 1862, to the construction of the Keokuk, Fort Des Moines & Minnesota Railroad, which finally took the place of the projected river improvement. It will be seen that grants originally made for other improvements were turned, in process of time, to the help of railroads.

The first grant directly and specifically to aid railroad build-

ing is considered to be the act of Sept. 20, 1850, by which a grant was made to the State of Illinois of "every alternate section of land designated by even numbers, for six sections in width on each side of" the road and its designated branches. The road was to be built from the southern terminus of the Illinois and Michigan canal to a point near the junction of the Ohio and Mississippi rivers, with a branch to Chicago, and another via Galena to Dubuque in Iowa. To make good the lack of land from sales already made by the United States within those limits, the State was authorized to make necessary selection within fifteen miles of the road. The minimum price of land reserved by the government was doubled. It was provided that on failure to build the road the State should reimburse the government for lands sold, leaving the titles good to purchasers, and unsold lands should revert to the general government. This grant was important, not only in itself, but as a form that was mainly followed in succeeding grants. Specific sections were granted, instead of a general one-half of certain numbers of sections; it provided in positive terms for lands lost to the grant; designated the mode of disposing of the lands; increased the price of the reserved sections; and provided for reversion to the government in case of failure to build. The State of Illinois transferred its grant to a company which was to pay a perpetual seven per cent. of gross earnings into the State Treasury, and the Illinois Central Railroad was the result.

The next important grant gave lands to Missouri for building certain roads now known as the Hannibal & St. Joseph, and the Missouri Pacific southwest branch. It was mainly similar to the grant to Illinois two years before, but some details were added respecting disposal of the land. An important grant was made to Minnesota in 1854; but as it was repealed within a few weeks, I merely name it here. In 1856 grants were made to Iowa, Wisconsin and Michigan, and in 1857 to Minnesota, in which the peculiarity occurs of giving for railroads the odd sections. The sixteenth section had been originally given for school purposes to the congressional townships in the West, and in the newest States the thirty-sixth section also. The State therefore received one or two sections more in each township by having the odd numbered sections.

In 1862 came a grant of wider scope than State limits. A trans-continental line was encouraged, by donations, to sustain a

railroad and a telegraph line between the Missouri river and the Pacific ocean. The Union Pacific Railroad Company received the right of way 200 feet wide each side of the line, and necessary grounds for stations, buildings, workshops, etc., and was given the alternate odd numbered sections for ten miles each side the road instead of six, as in previous grants, with provision for bonds in further aid. The minuter details as to mineral lands and lands already sold, are omitted here. The Central Pacific, the Central Branch of the Union Pacific, and the Sioux City & Pacific, were started under similar grants. Here was instituted a series of grants to corporations direct, and, in 1864, the limits of donated land were extended to twenty miles each side the track. In the same act, aid was granted to the Burlington & Missouri River to build a road to unite with the Union Pacific, not further west than the 100th meridian, giving them ten sections on each side per mile, with no limitations as to where they should select their land, but no bonds were to go to them. In 1863, Kansas received a grant similar to the Iowa grant, except that it was for alternate sections, for ten sections instead of six, on each side. Under this were built the roads now known as the Atchison, Topeka & Santa Fé; Leavenworth, Lawrence & Galveston; and Missouri, Kansas & Texas. In 1864, additional similar grants were made to Missouri, Iowa, Michigan, Minnesota and Kansas, with some grants for wagon roads, which latter received only three sections on each side, where railroads had six to ten. In that year, too, came the Northern Pacific, with double the land through the Territories. Then came grants for the Atlantic & Pacific, and the Southern Pacific, in 1866; to the Denver Pacific, in 1869; to a branch line of the Southern Pacific, and to the Texas & Pacific, in 1871. Many grants were enlarged or the time extended. Four have been declared forfeited. About twenty grants have "lapsed" by non-compliance with the granting acts, and appropriate legislation has been recommended. These grants, if their terms were complied with, would put more than 215,000,000 acres at the disposal of the companies.

As Willis Drummond, Jr.—from whose summary of the land grants in aid of internal improvements I have drawn freely—tersely puts it: this, in one body, would make more than 335,000 square miles, or seven times as much as all Pennsylvania; only 6,000 square miles less than the original thirteen

States. As actually accomplished, however, the Land Department estimates the amount will only reach 187,000,000 acres.

LAND CONCESSIONS TO STATES FOR CANAL PURPOSES, 1827, TO JUNE 30, 1880.

States.	Dates of Laws.	Names of Canals.	Acres Granted and Certified.
Indiana	March 26, 1824		
	March 2, 1827		234,246
	May 29, 1830		29,552
	Feb. 27, 1841	Wabash & Erie	259,368
	Aug. 29, 1842		24,219
	March 3, 1845		796,680
	May 9, 1848		113,348
Ohio	March 2, 1827	Wabash & Erie	266,585
	June 30, 1834		
	May 24, 1828	Miami & Dayton	838,826
	April 3, 1830		
	May 24, 1828	General canal purposes	500,000
Illinois	March 2, 1827	To connect Illinois river and Lake Michigan	290,915
	Aug. 8, 1854		
	June 18, 1838	Milwaukee and Rock river	125,481
Wisconsin	April 10, 1866	Br'akwat'r & harb'r ship canal	200,000
	March 1, 1872	Extending time	
	March 7, 1874	Extending time	
Michigan	Aug. 26, 1852	St. Mary's ship canal	750,000
	March 3, 1865	Portage Lake and Lake Superior ship canal	200,000
	July 3, 1866		200,000
	July 6, 1866	Lac La Belle ship canal	100,000

RECAPITULATION.

Indiana	1,457,266	Wisconsin	325,481
Ohio	1,100,361	Michigan	1,250,000
Illinois	290,915	Total (fractions omitted)	4,424,073

LANDS GRANTED FOR RAILROADS.

States.	Acres Granted.	Acres Certified.
Illinois	2,595,053	2,595,053
Missouri	2,965,160	1,898,000
Iowa	6,795,527	3,940,270
Michigan	4,712,480	3,338,937
Wisconsin	4,808,486	2,672,808
Minnesota	9,992,041	5,925,251
Kansas	9,870,000	3,861,596
CORPORATIONS.		
Pacific Railroad	150,486,766	8,881,697
To which adding lands to Mississippi, Alabama, Florida, Louisiana and Arkansas, total is	215,203,807	42,847,408

RAILWAY GRANTS TO CORPORATIONS.

Companies.	Acts of Congress.	Acres Certified under Grants to June 30, 1879.
Union Pacific	July 1, 1862. July 2, 1864.	1,859,474
Central Pacific	July 1, 1862. July 2, 1864.	1,119,046
Western Pacific	July 2, 1864.	
Oregon Branch	July 25, 1866.	550,644
Kansas Pacific	July 1, 1862. July 2, 1864.	815,880
Central Branch Union Pacific	July 1, 1862. July 2, 1864.	186,408
Sioux City and Pacific	July 1, 1862. July 2, 1864.	41,318
Burlington & Missouri River in Nebraska	July 2, 1864.	2,874,090
Denver Pacific	July 1, 1862. July 2, 1864.	49,811
Texas & Pacific	March 3, 1869. March 3, 1871.	
Southern Pacific	July 27, 1866. March 3, 1871.	1,040,870
Northern Pacific	July 2, 1864.	743,493
Atlantic & Pacific	July 27, 1866.	
St. Louis & San Francisco	June 10, 1852. July 27, 1866.	504,865
California & Oregon	July 25, 1866.	
Oregon & California	July 25, 1866.	322,462
Oregon Central	May 4, 1870.	
Hannibal & St. Joseph	June 10, 1852.	608,506
Missouri Pacific	June 10, 1852.	1,161,204
St. Louis, Iron Mountain & Southern	June 10, 1852.	1,388,614
Cairo & Fulton	July 27, 1866.	
Missouri, Kansas & Texas	March 3, 1863. July 1, 1864. July 26, 1866.	658,068
Atchison, Topeka & Santa Fe	March 3, 1863.	2,474,686
Kansas City, Lawrence & Southern		
Leavenworth, Lawrence & Galveston	March 3, 1863.	256,281
St. Joseph & Western	July 23, 1866.	463,011
Chicago, Burlington & Quincy	Each, May 15, 1856 and June 2, 1864.	388,817
Chicago, Rock Island & Pacific		643,307
Cedar Rapids & Missouri River		1,140,493
Ill. Cent. operating Dubuque & Sioux City		550,347
Ill. Cent. operating Iowa Falls & Sioux City		388,023
Sioux City & St. Paul	May 12, 1864.	407,910
St. Paul & Sioux City	March 3, 1857. May 12, 1864.	1,199,849
Winona & St. Peter (now C. & N.-W.)	March 3, 1865.	1,668,007
Southern Minnesota	July 4, 1866.	285,408
St. Paul & Duluth	May 5, 1864. July 13, 1866.	860,564
St. P., Minn. & Man.: St. Paul & Pacific	March 3, 1857.	
St. P., Minn. & Man.: First Division	July 12, 1862.	1,248,448
St. P., Minn. & Man.: Branch Line	March 3, 1865.	659,344
St. P., Minn. & Man.: St. Vincent Extension	March 3, 1871.	780,291
Stillwater & St. Paul, each	March 3, 1857.	
St. Paul, Stillwater & Taylor's Falls, each	March 3, 1865.	
C., M. & St. P.: Minnesota Central	March 3, 1857.	179,736
C., M. & St. P.: McGregor & Missouri River	May 12, 1864.	188,234
C., M. & St. P.: Hastings & Dakota	July 4, 1866.	169,799
Wisconsin Central	May 5, 1864.	575,884
Chicago, St. Paul & Minnesota, each	June 3, 1856.	802,816
North Wisconsin, each	May 5, 1864.	848,497
Total, including land taken by Southern Roads*		31,292,890

* I omit Southern roads not reaching the territory treated in this volume.

Various specific grants for educational purposes have been mentioned under the States interested. A grant of public lands, general in its application, was made for Agricultural Colleges, by which, enlarged by successive legislation, at last every State could avail itself of selections of public lands, using scrip issued for the purpose to locate the lands.

I have explained so fully in another place the policy toward internal improvements with the various road land grants that I merely name it here to preserve its relation to the general land system. A large amount of land extended by various decisions to include most land that was ever overflowed at high water in the streams, was donated to the States in which it was located. This is the swamp land donation.

LAND PATENTED TO STATES, AS UNDER SWAMP LAND ACTS, TO JUNE 30, 1880.

States.	Indemnity.	Total.
Ohio	.....	25,640
Indiana	4 280	1,257,588
Illinois	2,309	1,454,289
Michigan	18,903	5,659,217
Wisconsin	34,910	3,071,459
Minnesota	.....	1,359,999
Iowa	321,468	1,173,945
Missouri	97,063	3,315,170
California	.....	1 413,503
Oregon	.....	4,449

In addition to the pay and pensions allowed to soldiers and sailors of the United States, land donations have been given mainly under specific laws, and to be selected with what is popularly known as bounty scrip, or land warrants, much of which was transferable property. Besides the opportunity of purchase at the government price, varying in different periods and with various classes of lands, great efforts have been made to encourage settlement by laws especially favoring actual settlers. Any one can obtain a home by the necessary residence on a quarter section, or 160 acres, under what are known as the homestead acts.

Particular inducements were also made for tree planting in treeless regions, forming the timber-culture laws. Specific legislation has been adopted regarding the timber lands, mineral lands, and desert lands, but with regard to these and the disposal of remaining lands there is a general feeling that what is

done is rather an indication of recognition of the importance of the subject than an adequate provision for the special emergencies of such property. The general survey and sale system was adopted when great cultivable tracts of nearly level surface seemed to be all that would ever need consideration. The angles of rich mineral seams, and a multitude of items modifying the rights of occupiers, especially in mining regions, were not considered, and must yet come into our general plans more fully. Thus far the basis of national law as to mining lands has been the customs established by miners who discovered and developed the mines in advance of the surveyor. Another series of laws pertains to lands reserved or transferred to Indians in their tribal capacity. This condensed outline of the land system of the United States will make intelligible, I trust, the following table in which the lands disposed of for the year are given under their appropriate heads:

DISPOSAL OF PUBLIC LANDS, YEAR ENDING JUNE 30, 1880.

MANNER.	Acres.	Gain over previous year.	Decrease from previous year.
Cash entries	850,740	228,166	.....
Homestead entries	6,045,570	785,459	573,389
Timber culture entries	2,193,184	.....	.....
Agricultural college scrip	1,280	320	.....
Military bounty land, Warrant acts of 1847, 1850, 1852, 1855	88,522	87,702	.....
State selections:			
For school indemnity 206,089			
For internal improvements 223,140			
For agricultural colleges 2,360			
For public buildings 3,549	* 435,189	248,798	.....
Scrip locations:			
Sioux half-breed scrip 4,151			
Chippewa half-breed scrip 3,040			
Valentine scrip 1,720			
Cole's scrip 1,514			
Choctaw scrip 480	10,905	6,249	.....
In lieu of lands in private claims, not taken in placer acts, June 2, 1858, and June 22, 1860	195,516	107,943	.....
Donation claims in Oregon, Washington, New Mexico, under acts of 1850, 1853, 1854	86,552	.....	.....
Settlers' relief act, March 3, 1875	160	.....	.....
Patented to States as swamp land act of Sept. 28, 1850, or March 2, 1849	3,757,888	3,682,500	.....
For railroad purposes	1,157,375	879,040	.....
For wagon road purposes	19,485	.....	.....
Totals	*14,792,371	5,458,988	.....
Aggregate money received	$3,290,161.60	$407,048.04	.....

* The apparent error in the footings is from omitting fractions.

After all the sales, all the donations for schools, for improvements, for swamp lands to be reclaimed by the respective States, and for all other purposes whatever, it is estimated that the government still had, on the first day of July, 1880, unsurveyed and unoffered lands amounting to almost 700,000,000 acres, exclusive of Alaska. The greater care in looking after timber lands will add to the value of those already surveyed. Our mineral lands will have a higher value as the introduction of machinery is further facilitated by improved modes of transportation. Higher culture, irrigation, and the stimulus of demand from mining camps and from the great hives of manufacturing industry, will bring many a now neglected acre to a high value, and the land of the United States will be more and more the foundation of its prosperity, as wise practice and judicious legislation mature.

APPENDIX.

I have deemed it advisable to publish, as an Appendix, the following articles, which were written after this book was in type, and all of which contain important official data not obtainable while the volume was in process of completion.

THE AREA OF OUR LAND AND WATER.

Early in the progress of the geographical work of the Tenth Census, Mr. Henry Gannett, the geographer, found that it would be necessary to revise the figures which have popularly passed as the areas of the several States and Territories of the Union. In some States many different estimates of area passed current, differing from one another by thousands of square miles, and none of them, perhaps, traceable to any authentic source. The result of this work, in which Mr. Gannett was assisted by Mr. F. De Y. Carpenter, was published in an extra census bulletin. It is by no means a simple question to decide what constitutes the boundary of the United States. Our jurisdiction extends to a line three nautical miles from the shore, but this strip of sea can not properly be regarded as a portion of the country. If we restrict our boundary to the seacoast, the question comes up, Where should we draw the lines across the indentations made by the sea? In this matter the geographer of the census has been obliged to follow his own judgment, making in each case as natural a decision as possible.

The areas of included bodies of water, as bays and other inlets of the sea, lakes, ponds, etc., were in most cases determined by direct measurement from maps. In some cases, as in Maine, the water surface has been carefully measured by experts. In the unsettled portions of the West, where the land surveys have not yet extended, the areas were taken from the best maps to be had. It was a difficult matter to determine the area of the river surface even approximately. This bulletin also gives a list of the principal inland lakes of the United States, with their areas. From the best county maps attainable, a table has been constructed showing the areas of counties. These maps have been corrected arbitrarily in order to make them add up to the areas of the State. In the States surveyed by the General Land Office, in which county lines follow the boundaries of survey by townships, the areas are susceptible of being deduced with a great degree of accuracy. In other States, where the county lines are located by minor natural or artificial points, such as houses, fences, roads or small streams, Mr. Gannett frankly acknowledges that the probabilities are against their being correctly drawn on even the best maps, and the areas are correspondingly uncertain. This is the case in most of the States on the Atlantic border, with West Virginia, Kentucky and Tennessee in the interior.

Without attempting to explain the method adopted in the measurement, which would be altogether too technical for these pages, it will be interesting to briefly summarize the results of this inquiry into the approximate area of the United States. The total area, according to this computation, is 3,025,600 square miles, of which 17,200 square miles may be considered coast water (bays, gulfs, sounds, etc.), 14,500 square miles rivers and smaller streams, and 23,900 square miles lakes and ponds, making a total water surface of 55,600 square miles, and of land surface 2,970,000 square miles. The following table gives the total areas of the States and Territories in detail:

States and Territories.	Total areas.	Coast waters, gulfs, bays, etc.	Rivers and smaller streams.	Lakes and ponds.	Total water surf.	Total land surf.
Alabama	52,250	440	260	10	710	51,540
Alaska	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Arizona	113,020	[illegible]	80	20	100	112,920
Arkansas	53,850	[illegible]	540	265	805	53,045
California	158,360	540	240	1,600	2,380	155,980
Colorado	103,925	[illegible]	270	10	280	103,645
Connecticut	4,990	87	61	40	148	4,842
Delaware	148,100	[illegible]	610	190	1,800	147,700
Delaware	2,050	30	80	[illegible]	80	1,970
District of Columbia	70	[illegible]	10	[illegible]	10	60
Florida	58,680	1,800	260	2,020	4,440	54,240
Georgia	58,475	180	800	45	425	58,050
Idaho	84,800	[illegible]	200	810	810	84,000
Illinois	56,650	[illegible]	515	135	650	56,000
Indiana	36,350	[illegible]	260	110	440	35,910
Indian Territory	64,200	[illegible]	600	[illegible]	600	64,000
Iowa	56,025	[illegible]	450	100	550	55,475
Kansas	82,080	[illegible]	380	[illegible]	380	81,700
Kentucky	40,400	[illegible]	375	25	400	40,000
Louisiana	48,720	1,080	540	1,700	3,320	45,400
Maine	33,040	545	300	2,200	3,145	29,895
Maryland	12,210	1,350	260	[illegible]	1,610	10,600
Massachusetts	8,315	125	60	90	275	8,040
Michigan	58,915	[illegible]	260	1,225	1,485	57,430
Minnesota	83,365	[illegible]	260	5,070	5,180	79,185
Mississippi	46,810	30	240	100	370	46,440
Missouri	69,415	[illegible]	630	50	680	68,735
Montana	146,080	[illegible]	410	260	670	146,410
Nebraska	76,850	[illegible]	600	40	670	76,180
Nevada	110,700	[illegible]	75	825	900	109,740
New Hampshire	9,305	[illegible]	80	220	300	9,005
New Jersey	7,815	305	130	25	360	7,455
New Mexico	122,580	[illegible]	115	5	120	122,460
New York	49,170	570	300	900	1,770	47,400
North Carolina	52,250	3,200	200	160	3,560	48,690
Ohio	41,060	[illegible]	140	160	300	40,760
Oregon	96,030	50	300	90	1,470	94,560
Pennsylvania	46,215	[illegible]	300	30	330	44,885
Rhode Island	1,250	175	10	30	215	1,035
South Carolina	30,570	715	190	5	910	29,660
Tennessee	42,050	[illegible]	300	100	400	41,700
Texas	265,780	5,510	300	190	6,000	259,780
Utah	84,970	[illegible]	60	2,700	2,760	82,110
Vermont	9,565	[illegible]	50	300	350	9,215
Virginia	42,450	1,780	300	270	2,350	40,100
Washington Territory	69,180	1,230	300	600	2,130	67,050
West Virginia	24,780	[illegible]	125	[illegible]	125	24,655
Wisconsin	56,040	[illegible]	420	1,170	1,590	54,450
Wyoming	97,890	[illegible]	95	220	315	97,575
Unorganized Territory	5,740	[illegible]	[illegible]	[illegible]	[illegible]	5,740
Delaware Bay	680	680	[illegible]	[illegible]	680	[illegible]
Raritan Bay and lower New York Bay	100	100	[illegible]	[illegible]	100	[illegible]
Totals	3,025,600	17,200	14,500	23,900	55,600	2,970,000

POPULATION OF THE UNITED STATES IN 1880.

The following table presents the final official figures of the population of the United States at the Tenth Census, with a column showing, for comparative purposes, the population of 1870. It contains, also, the tabulation of the population according to sex, showing that as a rule there is a considerable excess of females in the older States, and a large excess of males in the newer States. As might reasonably have been anticipated, the excess of males is greatest in the mining States and Territories, where in Colorado it is nearly 100 per cent., and in Arizona it is 130 per cent.

The figures for Indian Territory and Alaska are omitted, as their inhabitants are not considered citizens. All Indians not subject to taxation are also omitted, in conformity with the census law.

COMPARATIVE TABLE OF POUPLATION IN 1880 AND 1870, AND TABULATION ACCORDING TO SEX IN 1880.

States and Territories.	1880.	1870.	Male.	Female.
The United States	50,155,783	38,558,371	26,013,566	24,142,217
The States	49,371,340	38,115,641	25,577,110	23,794,230
Alabama	1,262,505	996,992	628,295	634,210
Arkansas	802,525	484,471	416,129	386,396
California	864,694	560,247	518,176	346,518
Colorado	194,327	39,864	128,112	66,215
Connecticut	622,700	537,454	302,756	319,944
Delaware	146,608	125,015	74,101	72,507
Florida	269,493	187,748	144,844	124,649
Georgia	1,542,180	1,184,109	762,698	779,482
Illinois	3,077,871	2,539,891	1,582,065	1,495,806
Indiana	1,978,301	1,680,637	1,010,971	967,330
Iowa	1,624,615	1,194,020	844,316	780,299
Kansas	996,096	364,399	528,077	468,019
Kentucky	1,648,690	1,321,011	833,892	814,798
Louisiana	939,946	726,915	486,954	453,992
Maine	648,936	626,915	320,774	328,162
Maryland	934,943	780,894	466,167	468,776
Massachusetts	1,783,085	1,457,351	858,414	924,671
Michigan	1,636,937	1,184,059	826,243	810,694
Minnesota	780,773	439,706	411,265	369,508
Mississippi	1,131,597	827,922	567,456	564,141
Missouri	2,168,380	1,721,295	1,112,107	1,056,273
Nebraska	452,402	122,993	246,881	205,521
Nevada	62,266	42,491	42,491	19,775
New Hampshire	346,991	318,300	174,467	172,524
New Jersey	1,131,116	906,096	574,297	556,819
New York	5,082,871	4,382,759	2,603,301	2,477,570
North Carolina	1,399,750	1,071,361	687,906	711,844
Ohio	3,198,062	2,665,260	1,611,524	1,586,538
Oregon	174,768	90,923	100,351	74,417
Pennsylvania	4,282,891	3,521,951	2,169,253	2,113,638
Rhode Island	276,531	217,353	135,028	141,503
South Carolina	995,577	705,606	489,566	506,011
Tennessee	1,542,359	1,258,520	765,877	776,482
Texas	1,591,749	818,579	819,717	772,032
Vermont	332,422	330,551	169,863	162,559
Virginia	1,512,565	1,225,163	758,708	753,857
West Virginia	618,457	442,014	318,926	299,531
Wisconsin	1,315,497	1,054,670	660,723	654,774
The Territories	784,443	442,730	436,456	347,987
Arizona	40,440	9,658	28,240	12,200
Dakota	135,177	14,181	82,233	52,944
District of Columbia	177,624	131,700	88,059	89,565
Idaho	32,610	14,999	21,511	11,099
Montana	39,159	20,595	28,151	11,008
New Mexico	119,565	91,874	64,435	55,130
Utah	143,906	86,786	74,403	69,503
Washington	75,116	23,955	49,272	25,844
Wyoming	20,846	9,118	14,152	6,694

Next I give the census of 1880 tabulated according to the distinctions of race and color. Observe that the column headed "Colored" comprises only persons of African descent. The heaviest percentage of foreign population is collected in and about the great manufacturing and commercial centres, and in the very newest of the Western States and Territories. More than a fourth of the population of Massachusetts and New York are of foreign birth, while the ratio in Illinois is less than one-sixth.

This census effectually dispels the popular delusion as to the extent of the Chinese immigration. The total Chinese population is shown to be barely 105,465, of which California contains about 75,000. If to the Indians not now in tribal relations, above enumerated, we could add a census of the Indians of all the various tribes, including those of Alaska and the population of the Indian Territory, our total Indian population would be shown, probably, to be not far from 275,000.

CENSUS OF POPULATION ACCORDING TO RACE AND COLOR.

States and Territories.	Native.	Foreign.	White.	Colored.	Chinese.	Jap.	Ind'n.
The United States	43,475,840	6,679,943	43,402,970	6,580,793	105,465	148	66,407
The States	43,871,536	6,499,784	43,714,479	6,518,573	93,782	141	44,595
Alabama	1,262,771	9,734	662,185	600,103	4	.....	213
Arkansas	722,175	10,350	591,531	510,896	138	.....	125
California	571,330	292,974	787,181	9,015	75,132	86	16,377
Colorado	154,237	39,730	191,135	2,435	513	.....	134
Connecticut	483,708	180,982	610,789	11,547	193	6	952
Delaware	127,140	9,488	120,160	28,462	1	.....	5
Florida	202,551	9,109	142,605	126,660	16	.....	180
Georgia	1,231,616	10,364	816,906	725,133	17	.....	124
Illinois	2,494,205	653,573	3,031,151	46,266	209	3	140
Indiana	1,824,123	144,178	1,956,795	39,228	29	.....	249
Iowa	1,502,965	281,450	1,614,600	9,516	83	.....	466
Kansas	696,010	110,089	902,155	43,107	19	.....	615
Kentucky	1,259,178	59,617	1,377,179	271,451	10	.....	59
Louisiana	695,600	54,143	454,954	483,053	459	.....	948
Maine	690,056	90,507	646,893	1,451	6	.....	696
Maryland	802,127	82,976	724,693	210,230	b	.....	15
Massachusetts	1,520,564	443,491	1,763,789	18,007	269	8	990
Michigan	1,549,459	298,536	1,814,590	18,100	97	1	7,249
Minnesota	613,097	207,679	778,884	1,564	94	1	2,200
Mississippi	1,132,366	9,300	479,398	650,291	51	.....	1,227
Missouri	1,964,201	211,578	2,082,598	145,320	91	.....	112
Nebraska	354,923	97,414	446,764	2,585	18	.....	230
Nevada	93,613	25,633	59,516	486	5,416	3	2,826
New Hampshire	300,497	43,394	340,529	695	14	.....	53
New Jersey	908,416	321,700	1,099,017	29,853	170	2	74
New York	3,871,498	1,311,379	5,016,082	65,104	909	17	819
North Carolina	1,300,808	3,743	867,242	531,277	.....	1	1,230
Ohio	3,505,119	394,943	3,717,960	79,000	109	3	120
Oregon	144,305	30,538	169,075	497	9,510	2	1,054
Pennsylvania	3,605,093	897,209	4,197,016	85,330	145	3	184
Rhode Island	252,589	73,993	320,650	5,466	27	.....	77
South Carolina	687,091	7,688	391,105	604,233	9	.....	121
Tennessee	1,542,359	34,703	1,398,331	432,181	21	.....	1,529
Texas	1,477,123	114,616	1,197,237	393,994	128	.....	998
Vermont	321,347	40,959	351,318	1,057	.....	.....	11
Virginia	1,497,520	14,894	880,858	631,818	4	.....	83
West Virginia	620,138	18,985	592,537	45,956	5	.....	39
Wisconsin	910,073	403,425	1,309,616	2,708	26	.....	2,181
The Territories	604,304	180,159	688,491	82,631	11,683	7	21,841
Arizona	24,291	16,049	35,180	155	1,930	3	9,476
Dakota	62,393	51,795	133,147	401	238	.....	1,291
District of Columbia	160,501	17,132	118,009	59,006	13	4	5
Idaho	22,705	9,974	30,013	53	2,979	.....	185
Montana	27,291	11,261	36,265	246	1,765	.....	1,023
New Mexico	111,314	8,051	108,721	1,015	57	.....	9,772
Utah	92,989	43,904	142,623	220	501	.....	607
Washington	39,513	15,603	47,109	335	2,145	3	4,405
Wyoming	14,303	5,390	19,427	196	914	.....	140

DENSITY OF POPULATION.

In a recent bulletin of the Census Office, General Walker continues his computations relating to the density of population, in comparison with the corresponding results contained in his article on the Progress of the Nation, in the Statistical Atlas of 1874. The lowest grade of settlement taken for this purpose is that which contains a population of 2 to the square mile, the Census Office regarding all the region outside this line as practically unsettled territory. Upon the definition thus taken, the settled area of 1880 is mainly comprised in one large body, stretching from the northern to the southern limits of the country, and from the Atlantic coast westward to the plains. In this body is comprised 95 per cent. of the total population of the country. This region has been divided, according to the density of population, into five classes: a population of from 2 to 6 to a square mile, from 6 to 18 to a square mile, from 18 to 45 to a square mile, from 45 to 90 to a square mile, and 90 or more to a square mile. The following table shows the areas in square miles of the different classes of settlement from 1790 to 1880:

YEARS.	Total area of settlement; 2 or more to the square mile.	1 2 to 6 to the square mile.	2 6 to 18 to the square mile.	3 18 to 45 to the square mile.	4 45 to 90 to the square mile.	5 90 and over to the square mile.
1790	239,935	93,420	69,245	59,269	13,031	630
1800	365,708	81,010	138,207	92,504	17,724	1,191
1810	407,949	116,039	134,419	108,125	27,440	1,926
1820	502,717	140,227	177,153	120,260	60,004	4,943
1830	638,717	151,493	225,694	166,808	85 443	8,414
1840	807,368	188,607	291,819	241,567	84 451	8,924
1850	970,240	223,027	364,668	328,790	100 794	11,964
1860	1,194,754	260,995	453,241	421,601	134,782	14,134
1870	1,573,398	345,917	598,475	470,529	174,036	18,428
1880	1,849,670	394,980	673,960	654,300	222,010	34,500

The first three of these groups of population of different density indicate a predominantly agricultural condition. In the fourth and fifth groups trade and manufacture arise, and the classes rendering personal and professional services are multiplied. Of the agricultural groups, the first represents a very sparse population, and this group is mainly along the frontier, in Florida, Minnesota, Nebraska, Kansas, Texas, California, Colorado, Oregon and the Territories.

A highly successful agricultural condition is indicated by the third group, while the second group indicates merely the existence of defined farms or plantations and the systematic cultivation of the ground. This latter group is still large in many of the Western and Southwestern States, and in the mountainous regions of the Atlantic slope. The third class is the predominant group in Alabama, Delaware, Georgia, Tennessee, Virginia and Wisconsin. Of the New England States, Maine, New Hampshire and Vermont also have large tracts in this degree of settlement.

The fourth group—45 to 90 inhabitants to the square mile—is found in excess of any other in Connecticut, Indiana, Maryland, Massachusetts, Michigan, New York, Ohio and Pennsylvania, and, of course, this density of population indicates the existence of commercial and manufacturing industry, and the multiplication of personal and professional services.

Less than 25,000 square miles were found populated with an excess of 90 to the square mile. This group represents a very advanced condition of industry, and only

in New Jersey and Rhode Island, where manufacturing and trading villages are numerous, is this found in excess of every other group. At the first census, as the table indicates, only a few counties were found populated to this extent.

The annexation of fresh territory to the settled area has a tendency to increase the lower groups; at the same time the increase in group 3 has been comparatively large, while in 4 and 5 it has been larger than ever before. The following table gives the percentages of increase during the past decade:

	Per cent. of increase.		Per cent. of increase.
Total settled area	22.4	Group 2	17.5
Group 1	14.5	Group 4	33.3
Group 3	2.3	Group 5	34.1

Instructive results may be obtained by carrying the analysis further. Classified according to the order and condition of settlement, we have (*a*) the original thirteen States, with those formed from them, Maine, Vermont and West Virginia; (*b*) Kentucky, Tennessee, Ohio, Indiana, Illinois, Michigan, Missouri, Arkansas, Louisiana, Mississippi, Alabama and Florida; (*c*) the remaining States and Territories. The tables presented in the bulletin of these three groups of States show that in group *a* the increase in settled area was marked at each decade up to 1830, and from that time down to 1860 the increase was little more than nominal. During this time group 1 never increased at all, the higher densities of settlement not only absorbing all the current growth of settlement, but steadily encroaching upon No. 1, which has been reduced from 72,366 square miles in 1790 to 12,500 in 1860, which is comprised in Maine, New Hampshire and Georgia. In group of States *b* the total area of settlement has continued to increase without interruption to the present date. Group 1 increased until 1840; lost heavily until 1870. Since then, owing mainly to the spread of settlements in Michigan and Florida, it has increased again. Group 5—over 90 inhabitants to the square mile—did not put in an appearance in this group of States until 1860. It consists of 3,360 square miles, comprised in the States of Ohio, Illinois and Kentucky. Before 1840 there was no settlement of any note in group of States *c*, and the only State that boasts over 90 inhabitants to the square mile is Wisconsin, which has 450 miles in group 3. There are many other interesting combinations relating to the growth of population that a careful study of the bulletin affords, but space will not permit the further extension of this article.

AN INTERESTING DEBT STUDY.

The total population, assessed valuation and per capita valuation of the United States, are as follows:

States and Territories.	Population.	Assessed Valuation.	
		Amount.	Per capita.
New England States	4,010,529	$ 2,653,973,296	$ 661.77
Middle States	11,706,183	8,267,370,848	472.59
Southern States	15,707,329	2,703,940,990	172.16
Western States	18,581,369	6,150,284,014	330.98
Territories	995,919	226,612,039	211.95
Total United States	50,196,703	$ 19,997,180,187	$ 398.37

The bonded, State and local debt and the annual interest charge, the per capita bonded debt and the per capita annual interest charge, I have carefully worked out, with the following results:

States and Territories.	Amount.	Per capita.	Amount.	Per capita.
New England States	$ 170,884,227	$ 44.84	$ 8,953,772	$ 2.37
Middle States	490,782,000	41.57	26,977,010	2.31
Southern States	201,007,000	13.49	12,060,000	.80
Western States	243,654,000	14.17	17,070,000	1.00
Territories	1,084,381	3.79	120,295	.42
Total United States	$ 1,117,331,571	$ 20.59	$ 69,324,077	$ 1.28

It will be seen that the annual charge of the debt on the taxpayers of the country is about the same as that of the national debt at the present time ($69,451,244). It bears heaviest in the New England and Middle States, though the assessed valuation tables show that the per capita wealth is far higher in the two former than in the three latter divisions.

The total bonded State, county, city and township indebtedness of the United States has been analyzed by the Census Office. It appears that "railroad and other aid" comes first, representing 16 $\frac{11}{100}$ per cent.; funding floating debt, 13 $\frac{13}{100}$ per cent.; water works, 13 $\frac{1}{100}$ per cent.; refunding old debt, 12 $\frac{4}{100}$ per cent.; miscellaneous, 11 $\frac{14}{100}$ per cent.; streets, 7 $\frac{7}{100}$ per cent.; war expenses, 6 $\frac{7}{10}$ per cent.; public buildings, 4 $\frac{11}{100}$ per cent.; parks and public places, 2 $\frac{1}{100}$ per cent.; improvements of harbors, river wharves, etc., 3 $\frac{6}{100}$ per cent.; bridges, 2 $\frac{1}{100}$ per cent.; schools and libraries, 2 $\frac{4}{100}$ per cent.; sewers, 1 $\frac{11}{100}$ per cent.; fire department, $\frac{4}{10}$ per cent.; and cemeteries, $\frac{1}{100}$ per cent.

The following table shows the percentage of the purposes for which the entire State and local debt has been contracted in the five geographical divisions of the country:

States and Territories.	Railroads.	Quarantine.	War Expenses.	Funding floating debt.	Refunding old debt.	Miscellaneous.	Public buildings.	Improvements of harbors, etc.	Parks and public places.	Bridges.	Streets.	Schools and libraries.	Sewers.	Fire department.	Cemeteries.	Water works.
New England States	7.9	0.0	6.0	7.6	4.5	9.5	3.1	2.6	1.1	2.0	11.0	2.1	1.1	0.4	0.1	29.9
Middle States	10.0	0.0	6.0	12.0	12.0	12.0	4.0	4.0	2.0	2.0	7.0	2.0	1.0	0.4	0.1	12.0
Southern States	20.0	17.0	8.0	12.0	20.0	12.0	4.0	4.0	2.0	2.0	4.0	2.0	1.0	0.4	0.1	12.0
Western States	8.0	0.0	6.0	12.0	12.0	12.0	4.0	4.0	2.0	2.0	7.0	2.0	1.0	0.4	0.1	12.0
Territories	....	....	6.0	....	....	2.0	0.2	....	....	....	....	....	....	....	....	....
Totals	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

The average rate of interest paid on this debt is 6 $\frac{1}{10}$ per cent. Of the total bonded debt, 16 $\frac{11}{100}$ per cent. is located in the New England States, but owing to the lower rate of interest that section is burdened with only 14 $\frac{1}{100}$ per cent. of the total annual charge. The Middle States owe 43 $\frac{11}{100}$ per cent. of the debt other than national, but are liable for 45 $\frac{1}{100}$ per cent. of the annual charge; the Southern States have 18 $\frac{1}{100}$ per cent. of the debt and 18 $\frac{1}{100}$ per cent. of the charge; the Western States, owing to the higher rate of interest, have 21 $\frac{1}{100}$ per cent. of the total debt and 24 $\frac{1}{100}$ per cent. of the annual charge; the Territories have $\frac{1}{100}$ per cent. of the total

and $\frac{11}{100}$ per cent. of the annual charge. The average rate of interest in the New England States is $5\frac{111}{1000}$ per cent.; in the Middle States, 6 per cent.; in the Southern States, $6\frac{1}{10}$ per cent.; in the Western States, 7 per cent.; in the Territories, $9\frac{1}{10}$ per cent. The following exhibit shows the per cent. of debt drawing the several rates of interest, the per cent. issued each year since 1880, and the per cent. maturing each year to 1900:

Rate, per cent.	Per cent.	Date.	Per cent.	Date.	Per cent.
10	2.	Previous to 1880	8.	Overdue	
9	.0004	1880	8	1880	3.
8	.025	1881	1.	1881	2.
6	4.	1882	1.	1882	3.
5½	.004	1883	1.	1883	2.
5 3-10	1.8	1884	4.	1884	3.
5	21.7	1885	2.	1885	3.
4½	1.4	1886	2.	1886	3.
4	45.	1887	3.	1887	3.
3½	.3	1888	3.	1888	3.
3	14.	1889	4.	1889	3.
4½	.6	1870	6.	1890	4.
4	.3	1871	6.	1891	4.
2½	1.5	1872	7.	1892	4.
2	.3	1873	5.	1893	3.
2	.6	1874	6.	1894	4.
Unspecified	4.	1875	5.	1895	3.
	100	1876	3.	1896	3.
		1877	4.	1897	3.
		1878	3.	1898	3.
		1879	6.	1899	3.
		1880	2.	1900	3.
		Unspecified	10.	Sub. to 1900	20.
				Unspecified	15.
			100		100

The purposes for which a large portion of our State and local debt has been contracted are very useful and beneficial ones, and in the case of railroads and water works may prove remunerative investments. It may be that large sums of money have been squandered, but it might be well to bear in mind the wonderful growth of the cities of the United States; that about one-quarter of the population is urban, and that many of the expenditures are but the results of massing of population in large centres of industrial energy.

THE VALUE OF AGRICULTURAL STATISTICS.

Mr. J. R. Dodge, special agent for the collection of the statistics of agriculture, has recently made public some interesting facts relating to the method adopted by the Census Bureau in this and kindred work, and also to some extent pointed out the merits and demerits of the work of the Agricultural Bureau and of the several States which attempt to supply statistics of cereals. Mr. Dodge is unquestionably the most experienced statistician we have in this line of inquiry, and he enjoys a long public record as a most painstaking and exact worker—where exactitude has been possible—but, as he frankly admits, exactness is almost unattainable in agricultural statistics. To collect all the facts of agriculture from millions of farms, on which few records are kept, is quite impossible. A variation of 1 or 2 per cent. from the facts would be considered in a high degree successful, and results varying 5 or 10 per cent. from the facts would not be without value in Mr. Dodge's estimation; but a greater departure from accuracy soon brings the statistics to the point of absolute worthless-

ness. This result, he thinks, is frequently attained in statistics of States, sometimes—we are inclined to think "sometimes" rather mild—in those of the Bureau of Agriculture, and "it is not altogether unknown in the census." This latter remark is a little ironical, and would indicate that, though greater progress toward accuracy has been made in the Tenth Census than in all preceding efforts in that direction, there is room for more in the future.

The statistics of cotton production and cotton area, as given by the census of 1880, are undoubtedly more nearly correct than any heretofore given, and this especially applies to the production, which virtually coincided with the results obtained by private effort.

In regard to cereals, Mr. Dodge says that the estimates of the Department of Agriculture are perhaps nearer the truth than the assessors' returns of States. Sufficient data for estimate and a knowledge of local conditions, with a capacity for combination and generalization, may produce more reliable results than a poor census. The facilities of the Agricultural Bureau are limited, and the public demand physical and mental impossibilities; in place of it they get "wholesale guessing."

The new census law, added to the efficiency of the enumerators and the appointment of trained specialists to superintend the several branches of their work, reduce the errors of enumeration of record and of compilation. By patience and the exercise of enlightened judgment it is hoped that the larger portion of the errors may be corrected, though, Mr. Dodge rather despairingly says, "the ingenuity of some displacements and blunders of enumerators amount almost to development of genius."

The important facts brought out by the census inquiry in relation to cotton, tobacco and the cereals have already been widely published, but a further analysis of some of the cereal statistics brings out both interesting and instructive points showing the distribution of grain. For instance, nearly 53 per cent. of the area in cereals is occupied by corn, while the product is 63 per cent. of the grand aggregate. Wyoming and Alaska are the only Territories where corn is not raised. Every State produces it. Illinois, Iowa and Missouri produced, in 1879, more than 800,000,000 bushels, nearly half of the whole product, and 40,000,000 bushels more than the total corn product of 1869. Only seven States ever have any considerable surplus: Ohio, Indiana, Illinois, Iowa, Missouri, Kansas and Nebraska. These States contribute 1,200,000,000 bushels, 68 per cent. of the crop, on 53 per cent. of the area, exceeding 36 bushels per acre, while the average yield for the remainder of the country was but 19.6 bushels.

The supply of wheat per capita has been rapidly increasing:

YEARS.	Bushels.	Per head.
1849	100,486,844	4.9
1859	173,104,924	5.5
1869	287,745,538	7.6
1879	459,483,136	9.0

The march westward, as Mr. Dodge shows us, has not been less remarkable:

YEARS.	Atlantic coast.	Central belt.	Trans-Mississippi.
1849	51,607,240	49,000,240	1,879,364
1859	76,694,137	94,000,000	22,410,787
1869	97,078,871	145,277,070	45,389,596
1879	96,000,000	290,000,000	171,000,000

These figures denote that the largest volume of increase has been in the central belt, but the largest ratio in the trans-Mississippi:

	1840.	1860.	1880.	1879.
Atlantic coast	31.5	32.7	29	31.5
Central belt	49.5	51.6	40	40.1
Trans-Mississippi	9.3	15.7	31	27.5
Totals	100	100	100	100

The seven surplus corn States, and, in addition, Michigan, Wisconsin and Minnesota, and two States on the Pacific coast, with two Territories—Washington and Dakota—supply the East and Europe with wheat. Wheat culture, according to Mr. Dodge, is not passing west of the Mississippi and disappearing eastward, and the spring wheat regions do not supply most of the surplus. On the contrary, the winter wheat represented three-fourths of the crop in 1879. About four-tenths of the crop is produced north of the Ohio and east of the Mississippi—nearly 180,000,000 bushels in the four winter wheat States, Michigan, Ohio, Indiana and Illinois. In this region tile drainage and better cultivation are bearing fruitful results. In speaking of this improved agriculture, Mr. Dodge says: "The Ohio valley has passed the pioneer stage in agriculture, and is progressing toward true agricultural improvement, based on scientific principles and practical economic methods. The aim should be to get still further away from primitive methods and average yields of 10 or 12 bushels per acre, and to approximate 25 to 30 bushels."

LIVE STOCK OF THE WEST IN 1880.

Below I give the Live Stock statistics of the States and Territories treated of in this volume, according to the Census estimates for 1880:

States and Territories.	Horses.	Mules and asses.	Working oxen.	Milch cows.	Other cattle.	Sheep.	Swine.
Arizona	3,726	691	894	3,186	24,943	112,107	3,617
California	327,710	89,243	8,000	210,073	461,941	3,644,341	602,257
Colorado	48,241	4,021	4,750	18,750	211,000	494,000	7,000
Dakota	82,961	1,760	11,413	30,782	98,000	47,113	80,000
Idaho	24,600	310	577	14,000	77,000	20,000	15,000
Illinois	1,696,000	198,760	7	622,813	1,510,000	1,540,000	5,100,000
Indiana	951,444	151,720	3,000	607,944	1,000,000	1,616,000	5,100,000
Iowa	1,194,319	93,000	3,000	822,000	1,700,000	1,000,000	5,000,000
Kansas	530,000	54,000	10,000	416,000	1,000,000	1,000,000	1,000,000
Michigan	870,000	5,000	60,000	554,000	900,000	4,000,000	900,000
Minnesota	687,000	9,000	60,000	575,000	950,000	700,000	575,000
Missouri	1,000,000	180,000	6,000	600,000	1,400,000	3,000,000	4,000,000
Montana	39,000	1,000	2,000	11,000	200,000	500,000	20,000
Nebraska	350,000	10,000	7,000	300,000	600,000	600,000	1,000,000
Nevada	14,000	1,000	1,000	14,000	150,000	.....	5,000
New Mexico	14,000	2,000	10,000	14,000	127,000	.....	10,000
Ohio	1,000,000	10,000	8,000	707,000	1,000,000	4,000,000	3,000,000
Oregon	120,000	2,000	4,000	44,000	200,000	.....	100,000
Utah	40,000	4,000	2,000	17,000	60,000	.....	.....
Washington	50,000	1,000	1,000	11,000	60,000	.....	20,000
Wisconsin	800,000	7,000	20,000	470,000	600,000	1,000,000	1,000,000

THE WOOL CROP OF THE UNITED STATES.

Through the courtesy of the Superintendent of the Census, Colonel Charles W. Seaton, I am enabled to publish the following table, showing the wool clip of 1880, by number of fleeces and pounds of wool, also the average weight of fleeces:

States and Territories.	Number of fleeces.	Pounds of wool.	Average weight of fleece.
Alabama	847,000	703,000	3.19
Arizona	75,000	315,000	4.20
Arkansas	350,000	1,400,000	4.00
California	4,000,000	20,000,000	4.50
Colorado	1,000,000	4,000,000	4.00
Connecticut	75,000	300,000	4.00
Dakota	37,000	167,000	4.50
Delaware	2,000	7,000	3.50
District of Columbia			
Florida	30,000	120,000	4.00
Georgia	387,000	1,500,000	3.87
Idaho	75,000	337,000	4.50
Illinois	1,000,000	4,000,000	4.00
Indiana	1,500,000	6,000,000	4.00
Iowa	800,000	3,600,000	4.50
Kansas	350,000	1,575,000	4.50
Kentucky	1,000,000	4,000,000	4.00
Louisiana	100,000	400,000	4.00
Maine	175,000	875,000	5.00
Maryland	175,000	700,000	4.00
Massachusetts	50,000	200,000	4.00
Michigan	2,000,000	11,000,000	5.50
Minnesota	600,000	3,000,000	5.00
Mississippi	400,000	1,600,000	4.00
Missouri	1,000,000	4,000,000	4.00
Montana	1,000,000	4,500,000	4.50
Nebraska	150,000	1,000,000	6.66
Nevada	300,000	1,500,000	5.00
New Hampshire	75,000	300,000	4.00
New Jersey	117,000	468,000	4.00
New Mexico	3,000,000	4,000,000	1.33
New York	1,000,000	6,000,000	6.00
North Carolina	400,000	1,600,000	4.00
Ohio	4,000,000	20,000,000	5.00
Oregon	1,000,000	5,000,000	5.00
Pennsylvania	1,000,000	5,000,000	5.00
Rhode Island	7,000	35,000	5.00
South Carolina	150,000	600,000	4.00
Tennessee	600,000	2,400,000	4.00
Texas	3,000,000	9,000,000	3.00
Utah	300,000	1,500,000	5.00
Vermont	400,000	2,000,000	5.00
Virginia	600,000	2,400,000	4.00
Washington	200,000	1,000,000	5.00
West Virginia	200,000	1,000,000	5.00
Wisconsin	1,000,000	5,000,000	5.00
Wyoming	150,000	900,000	6.00
Totals	35,190,000	156,300,000	4.43

In Texas and in California, as well as in parts of intermediate regions, there are two clips of wool in a year, a spring clip and a fall clip. In some instances the census returns secured the spring clip only, and in some cases the schedules were answered so as to show the clip for both parts of the year, a variation which still needs fuller revision.

A large number of sheep are not to be found on farms, and in their wide range in Western Territories have not been reached by ordinary enumeration. These only reached by special investigations are known as ranche sheep.

The sheep killed as lambs and as fat sheep to butchers, carry some wool to the shambles not returned in the wool clip, but obtained through other returns as pulled wool.

The investigations of the Census Office are not so far completed as to give exact figures for the total wool product of the United States.

The regular returns of wool clip amount to 35,190,866 fleeces, 155,580,493 pounds, 4.42 pounds average weight of fleece. To this is to be added by estimate on data, largely obtained by Special Agent Gordon, 10,000,000 to 12,000,000 pounds for the two annual clips where enumerators secured reports of but one. Five million sheep are the estimated addition for ranche sheep, and 25,000,000 pounds a possible addition for their fleeces. From 30,000,000 to 35,000,000 pounds are likely to be obtained as pulled wool. This will give a total wool product of from 290,000,000 to 298,000,000 pounds.

We import a large amount of wool. In 1880 this amounted to 128,000,000 pounds, a very extraordinary import. The ordinary import is in the neighborhood of 60,000,000 pounds, and will probably fall much below that for 1881, as home production has been somewhat stimulated, and other causes have modified the supply.

At first sight the great import of wool would seem to be a serious dependence, but our farmers raise, mostly, wools of higher grades and better price, and can not afford to spend their time upon sheep that produce wool only fit for the uses of most of the imported wool.

BIRD'S-EYE VIEW OF OUR GOLD AND SILVER MINES.

It is said that well nigh five thousand million of gold and silver have been extracted from the earth since the world was startled by the discovery of gold mines in the distant and unknown regions of California, and, immediately afterwards, on the plains of Ballarat. The period is past when gold finding yielded its peerless and romantic harvests of wealth, and presented, both in California and Australia, its socially and economically peculiar features. In some of the newer States the discovery of remarkable silver mines has had a potent effect in developing the State, but not as widespread as the world's two great gold fields. But, for all this, the annual yield of precious metals has not greatly diminished, because the falling off in the gold product has been in part compensated for by the rapid increase in the production of silver. Thus, for example, in the United States while the yield of gold has remained about the same during the last ten years the silver product has more than doubled, and now exceeds the gold in value. In this inquiry the production is, in some cases, given for the calendar year 1880, which explains seeming discrepancies in figures given here and elsewhere in this volume.

The statistics for California are regarded as complete for over five-sixths of the total production of the State. They have been tabulated and arranged by counties by the Superintendent of the Mint at San Francisco. The total production of the State is put at $17,500,000 gold, and $1,100,000 silver. There are only three counties producing an aggregate of over $1,000,000 of precious metals: Amador, $1,497,006; Mono, $2,990,141, and Nevada, $2,772,506. There are eight counties producing over $500,000. There are thirty-three gold-producing counties.

The production of Nevada is still diminishing, especially in the mines of the Comstock lode. The silver production in the eastern portion of the State has increased. Since such great depths have been attained in the Comstock lode, the cost of mining has greatly increased, and several owners have ceased attempting to do more than prospect at lowest depth. The great need of Nevada at present is a means of working low grade ores. There are thousands of tons of such ores all over the State, but, by processes at present known, it is impossible to work them at a profit. During the

latter part of 1880 many men left Nevada for Idaho and New Mexico. The summary of bullion production for Nevada, by counties, for the fiscal year ending June 30, 1880, as reported from the mines, is as follows:

Counties.	Gold.	Silver.	Total.
Elko	$ 68,595	$ 895,184	$ 963,779
Esmeralda	953	1,894,900	1,895,853
Eureka	1,107,993	2,920,720	4,028,713
Humboldt	78,994	271,456	350,450
Lyon	32,773	148,821	181,594
Lincoln	7,883	444,717	452,600
Lander	700	1,044,545	1,045,245
Nye	99,977	705,483	805,460
Storey	3,222,840	3,184,142	6,406,982
White River	18,356	547,030	565,386
Totals	$4,719,070	$10,558,758	$15,277,828

The report says that information forwarded through the assayer in charge of the Denver Mint, in regard to the production of Colorado, was so incomplete that the details as to the production of the different mines and localities had to be gathered from reports published in the newspapers of the State and mining journals. The total production was estimated at $3,200,000 of gold and $17,000,000 of silver, and the production is steadily increasing. Since their discovery in 1878, the mines around Leadville have produced about $27,000,000 in gold, silver and lead. Not one of the mines worked has been exhausted. The production of gold and silver in the different counties during the calendar year 1880 would appear to have been:

Counties.	Gold.	Silver.*	Total.
Lake	$ 55,000	$13,000,000	$13,055,000
Gilpin	1,200,000	300,000	1,500,000
Clear Creek	150,000	2,400,000	2,550,000
Boulder	200,000	550,000	750,000
Custer	100,000	200,000	300,000
Park	50,000	250,000	300,000
Gunnison	.....	300,000	300,000
Summit	51,000	460,000	511,000
Chaffee	31,500	80,000	111,500
San Juan	40,000	325,000	365,000
Totals	$2,206,500	$18,615,000	$21,821,500

These three States, it will be seen, produced nearly $55,000,000 of the $75,000,000 worth of gold and silver produced in 1880, the remaining $20,000,000 being distributed, with the exception of a small amount in Oregon, Georgia, North Carolina, South Carolina and Virginia, among the Territories. By far the most important of these at the present time are Utah, Montana, Dakota and Arizona.

The following is the recapitulation of a detailed statement of the amount of gold, silver and lead produced by the different smelting works and mills of Utah:

2,892,496 pounds refined lead	$ 144,624.80
28,442,032 pounds unrefined lead	661,032.34
3,793,566 ounces silver †	4,161,393.60
5,020 ounces gold †	100,400.00
Total	$5,127,950.82

* Silver in the statement is calculated at its coining rate.

† Silver valued at $1.10 and gold at $20 per ounce.

Utah is doing well, and though there is not so much excitement about her mines as there was a few years ago, a more healthy tone is manifest.

In Montana the severity of last winter and its long continuance forbade almost all prospecting, and interfered with mining operations; the estimate was $2,400,000 gold and $2,500,000 silver. This was produced in eight counties, Deer Lodge county aggregating $2,900,000.

The mineral-producing regions of Dakota, known as the Black Hills, cover a country from fifty to sixty miles long, from twenty to forty in width, and contain nearly 6,000 square miles of mineral-bearing rock and gravel beds. Here nature presents many new and striking features before unencountered in mineral sections, and in no place heretofore discovered have the precious metals been found under conditions so favorable for rapid extraction. Few mines are sufficiently developed to form conclusive opinions as to their full extent and value when great depth shall have been attained. The product, as estimated by the Director of the Mint for 1880, was $3,600,000 gold and $70,000 silver.

The mining progress of the other Territories may be summarized briefly. In Arizona progress has been remarkable during the past two years, the inaccessibility of the region heretofore being the main drawback. If we take the estimate for the calendar year instead of the fiscal year of 1880, the total product of Arizona would reach $5,566,601, which places this Territory in the fourth place in the production of precious metals. This estimate is considered moderate, as the local papers claim a total of $7,000,000. The yield for the present year is estimated at $8,000,000 to $10,000,000. The production of gold and silver of Washington Territory is, annually, the least of any. The mining interests of Idaho are again attracting the attention they did some years ago, but this time, it is claimed, with better reason. The total product of New Mexico from 1848 to 1880 was $8,075,000, the last five years having averaged about $500,000 annually. This, then, may properly be called a bird's-eye view of our great inheritance of mineral wealth.

INDEX.

A

Academies (see Education).
Adams, C. F. 94, 95
Advertiser, Boston 102
Aërtes (see Diagrams).
Agriculture (see Separate States and Territories, and Tables) 15
Agricultural Bureau, United States 160, 171, 615, 619, 620, 627, 634, 701, 704, 705
Agricultural Implements (see Manufactures, Tables).
Agricultural Products (see Cereals, Tables, and under each State and Territory, and Appendix).
Agricultural Reports 170, 172, 176
Alabama 592
Alaska 34, 605, 606, 609, 628 707
Alder Gulch 410, 415
Alderton, Boston 102
Alhall 107
Allouez, Claude Jean 188
Alluvium 260, 267
"American Bottom" 189, 197, 199
American Fall 399
American Fur Co. 304, 320
American Geneticor 189
American Newspaper Annual 110
American Register 110
Apostle Islands 197
Appendix ..... 595—611
Arbor Day 606, 608
Area of Land and Water of the United States, (see Appendix).
Areas (see Diagrams; also under each State and Territory).
Army (see Diagrams) 80, 87, 622
Aridity 270, 277
Arid Regions 426, 429, 442, 454, 466, 470, 472, 1003
"Arid Lands" 415, 426
Arizona (see Territories) ..... 39, 341, 447, 448, 455—466, 611, 1000
Agricultural Products 460
Area 459
Banks 461
Cities and Towns—
Fort Buchanan 459
Fort Canby 459
Fort Defiance 459
Prescott 457, 461
Tucson 457, 461
Climate 458, 459
Counties, Population of 611
Debt 460
Elevation 458
Fauna 459
Flora 459
Geology 459
Gold 461
Grazing 460
History 455, 456
Indians 460
Irrigation 460
Minerals 461
Population 461
Railroads 461
Rivers 457
Ruins 461
Silver 461
Surface 458, 457
Timber 457

Arizona—
Wealth 461
Arkansas 626, 630, 634, 673, 697, 1000
"Arkansas Divide" 373
Arrowsmith 107
Arrowsmith, Walter 80, 107
Artisans (see Manufactures) 30
Arthur, Prof. J. C. 107
Asbestos 265
Assessment (see Tables).
Astor, John Jacob 321, 322
Atkinson, Edward 32, 1018, 1019
Atlantic 218, 220, 222, 1018
Augbey, Prof. Samuel 255, 267, 268, 269, 271, 272, 277
Australia (see Diagrams) 14, 16, 18, 97, 1018
Austria (see Diagrams) 12, 1018

B

"Bad Lands" (see also "Mauvaises Terres") 402
"Balance Sheet of the World, The" 17
Ballou 94
Banks (see under each State and Terr.) 19, 56, 1018
Barbed Wire Fence 537
Barges 1018
Barley in Grain Trade 548, 1018
Barley (see Cereals).
Barnes, C. R. 107
Bartlett, S. F. 107
Bay of San Francisco 426, 428, 434, 1018
Bees 117, 1018
Behring Sea 1018
Belgium (see Diagrams and Tables) 12
Beloit College 107
Bessemer Steel (see Iron, Manufactures) 31
"Big Bonanza" 48, 378, 379
Big Woods 1018
Bimet Ostrea 1018
Black Hawk War 1018
Blue 191, 1018, 1019, 1020
"Blizzards" 1018
"Block Coal" 1018
Blodgett, James H. 1018
Blodgett, Lorin 107
Blue Mound 1018
Board of Equalization 1018
Board of Public Charities 1018
Boards of Trade 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026
Bohemia 1018
Bonds (see Debt, and Tables) 1018
Bonneville, Captain 1018
Bonnet, Daniel 1018
Bonnets 1018
Bounty on Wild Animals 1018
Boundaries 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026
Brooks (see Irrigation) 1018
Bridge Manufactures and Bridges (see Iron, Manufactures) 1018
Bridges, Dr. Oliver 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026
Brigham, Dr. Amariah 1018
Brigham, Columbus (see Diagrams) 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026
British Forts 1018
British Possessions 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026
Brownwood (see Cereals) 1018
Building Stone (see Geology) 1018, 1019, 1020, 1021, 1022, 1023, 1024, 1025, 1026
Bureau of Statistics 1018
Burnet, Judge 1018
Burt, Gov. Francis 1018
Butter (see Manufactures and Dairy; also under each State).

C

PAGE

Cabrillo 495
Cache Valley 142
Cadillac, Antoine de la Motte 210
California (see Pacific States) 90, 231, 241, 254, 267, 268, 272, 273, 410, 470, 473, 481, 490, 515, 561, 587, 589
Admitted 282
Agricultural Products 499, 500
Area 490, 492
Bees 505
Chinese 510, 511
Cities and Towns—
Bodega 496
Cerro Gordo 508
Coloma 499
Crescent City 496
Drake's 496
Fort Miller 496
Fort Yuma 468, 476, 477
Golden Gate 496
Half Moon Bay 496
Los Angeles 513, 553
Mojave City 490
Monterey ..... 492—494, 496
Oakland 513, 551, 560, 551
Pueblo de los Reina de los Angeles, "Queen of the Angels" 528
Sacramento 513, 552
San Diego 450, 496
San Francisco (see Tables) 492, 496, 496, 510, 513, 551, 550, 551, 561
San Jose 513
San Luis Obispo 496
San Pedro 496
Santa Cruz 496
Sonoma 496
Stockton 513, 552
Sutter's Fort 499
Tomales 496
Trinidad 496
Climate ..... 492—499
Coal 505
Commerce 515
Copper 505
Counties (Grape) 508
Mining 506
Dairy 504
Debt ..... 512—514
Education 511
Elevation 490
Fauna 496
Flora 496
Fruit 495, 500, 508
Geology 505
Gold 498, 506
Grazing 504
History 490
Irrigation 498, 508, 508
Land 503
Live Stock 504
Mining ..... 505—508
Population ..... 508—511
Railroads 514
Rivers 494, 501
Salmon (table) 505
Silver 506
Surface 492, 495
Taxation 512
Volcanoes 494
Wealth ..... 511—512
Wine 498, 500, 508
Wool 504, 551
Camps, lists of 458, 459, 473
Canada (see Diagrams) 61, 63, 193, 203, 204, 340
Canadians 201, 317
Canals 140, 180, 189, 185, 184, 194, 213, 215, 263, 582, 543, 554, 564
Canning 503
Cañons 82, 489
Cape of Good Hope 144
Cape Horn 94
Cape Mendocino 490
Carp Lake 196

PAGE

Carrico Valley 1000
Cartier 203
Cascades 488, 489
Castillian 207
Castle Valley 144
Cave Dwellings 467
Census 6, 99, 147, 159, 197, 183, 198, 171, 175, 189, 197, 199, 198, 202, 214, 221, 224, 235, 237, 238, 241, 263, 264, 265, 270, 271, 285, 288, 293, 295, 296, 297, 311, 315, 321, 322, 329, 332, 333, 337, 373, 382, 385, 387, 401, 407, 417, 418, 426, 433, 443, 445, 451, 473, 484, 492
Centennial Exposition 201
Cemeteries (see City Debt Tables).
Cereals (see Agricultural Products, Diagrams and Tables) 13, 36, 41
Cerruschi 577
Chaparral 102
Chevalier, Michael 15
Chicago 182
Chinese 495, 508, 510
"Chinese in America" 510
Chittenden, Governor 319
Churches (see under each State and Territory).
Baptist 189, 235, 262, 266, 318, 319, 344, 354
Buddhist 500
Christian 319
Congregational 262, 319, 344
Disciples 262
Episcopal 319, 448
Friends 262
Methodist 189, 235, 262, 266, 318, 319, 344, 448
Mormons 440, 448
Presbyterian 189, 235, 266, 318, 319, 344, 448
Roman Catholic 189, 235, 266, 318, 319, 344
United Brethren 262
Cities, Western (see also under each State and Territory) ..... 516—553
Cities not in the West—
Albany 561
Baltimore 166, 515, 555, 560
Berlin 128
Boston 159, 515, 555, 559, 561
Brooklyn 166, 561
Burlington, N. J. 577
Castile 207
Dublin 128
Fort Arbuckle 468
Glasgow 128, 563
Greenwich 287, 560, 566, 470, 490, 560
Jersey City 561
Little Rock 562
Liverpool 563
London 128
Louisville 560, 560
Lowell 264
Lyons 128, 564
Manchester, England 564
Manchester, N. H. 560, 563
Mobile 562
New Orleans 166, 262, 443, 515, 560, 562
New York 35, 166, 185, 264, 515, 521, 555, 559, 561, 576, 578
Paris 128
Philadelphia 166, 262, 515, 555, 562
Pittsburg 50, 161, 555
Plymouth, Mass. 262
Richmond, Va. 207
Sonora 560
Washington, D. C. 235, 261, 262, 266, 405, 409, 420, 519, 560, 560
Wheeling 560
Clark, Gen. Geo. Rogers 189, 193
Clear Lake 501
Climate (see under each State and Territory) 100
Clothing (see Manufactures and Tables) 179, 182
Coal (see under separate States) 53, 54, 135, 165, 181, 196, 203, 208, 275, 276, 297, 298, 299, 311, 313, 325, 327, 331, 391, 404, 412, 424, 442, 443, 467, 479, 503, 537, 541, 543, 546
Cobalt 506
Cohuilla Valley 508
Collett, Hon. John 139, 141, 145

PAGE

Colorado.....5, 90, 295, 297, 299, 302, 334, 345, 349, 355, 367, 372–376, 408, 419, 420, 422, 430, 440, 447, 448, 462, 490, 504, 511, 550, 577
Agricultural Products.....380
Area.....373, 380
Banks.....380
Churches.....373
Cities (table).....384, 385
Cities and Towns—
Black Hawk.....380
Cañon City.....381
Central City.....380
Denver.....100, 373, 380
El Moro.....381
Georgetown.....380
Greeley.....375
Gunnison.....382
Leadville.....100, 373, 380, 549
Pueblo.....375
Walsenburgh.....381
(See also lists, pp. 377–379, 384, 385.)
Climate.....376
Coal.....381
Counties, Population of.....382
Debt.....383
Elevation (table).....374
Fauna.....381, 382
Flora.....379, 380
Fruit.....382
Geology.....377, 380
Gold.....373, 381
Health.....373
History.....372, 373
Humidity (table).....379
Irrigation (table).....382, 383
Lead.....373, 381
Live Stock.....380, 387
Mining.....372, 373, 380, 381
Organization of State.....373
Organization of Territory.....372
Peaks.....379, 380
Population.....384
Railroads.....382, 383
Rainfall (table).....377
Rivers.....374, 376, 381, 382
Schools (table).....383
Settled.....373
Silver.....373, 381
Surface.....374, 376
Timber.....380
Wealth.....384
Colorado Desert.....362
Commerce (see Tables and Cities; also under each State and Territory).....19, 36, 43, 44, 213, 214, 215, 313, 314
Commissioner of Railroads.....319
Commissioners of General Land Office.....323
Companies, Water.....99
Company of the West.....127
Competition in Transportation.....277, 283
Compromise Act.....325
Comstock Lode.....374, 376, 377, 475
Congress.....321, 324, 327, 492, 493, 505
Congressional Township.....321
Connecticut.....105, 327, 328
Coos Bay.....359
Cope, Prof. E. D.....108
Copper.....290, 291, 488, 489, 508, 540, 543
Coteau du Missouri.....327, 493, 498
Coteau des Prairies.....327, 493, 498
Cotton (see Manufactures, and Missouri).
County Lieutenants.....126
"County System".....373, 379
Courthemanche, Sioux.....169
Cox, E. T.....138, 139
Cuming, Thomas B.....138
Curley, Edwin A.....393
Custer, Gen.....405

D

Dairy (see under separate States).....176, 238, 241, 381, 388, 389, 510, 527, 531, 534
Dakota.....327—416
Agricultural Products.....401, 402

Dakota—
PAGE
Area.....396
Banks.....405
Census (table).....394
Cities (see list).....399, 400
Fargo.....404, 405
Fort Buford.....413
Climate.....399
Coal.....404
Counties, Cultivated Area, etc.....401
Elevation.....398
Exemption Laws.....406
Flora.....400
Geology.....397
Gold.....403, 404
History.....396, 397
Indians (table).....407
Lands.....403
Live Stock.....402
Lumber.....400
Manufactures (table).....402, 403
Mining.....397, 402, 404
Railroads.....407
Rivers.....403
Surface.....397
Timber.....400
Wealth (table).....401, 407
Wheat, Counties, list of.....401
Dalles.....359
Dalles of St. Croix.....359
Dalles of Columbia.....359
Dana, E. H.....130
Dedication.....3
Darien, Isthmus of.....24
Darius.....278
Davidson and Stuvé.....138
Dead Sea.....362
Deaf and Dumb.....294, 309, 378, 398, 413, 570
Death Valley.....362
Debt (see Diagrams, Tables and Appendix).....
Cities.....97, 99, 137, 138, 383, 384, 385
National.....15, 16, 17, 19
State.....83, 84, 70
Delaware.....319
De Lisle, Guillaume.....18
Denmark, Matthias.....170
Denmark (see Diagrams).....
Devil's Lake (Dak.).....
De Wolf, Dr. Oscar C.....
Diagrams—
I. Grain of the World.....18
II. Forest of the World.....18
III. Gold and Silver of the World.....18
IV. Manufactures of the World.....18
V. Industrial Product of the World.....18
VI. Railroads of the World.....
VII. Telegraphs of the World.....
VIII. National Income vs. Armies of the World.....
IX. and X. Area, Census, Population.....
XI. Areas U. S. and European Countries.....
XII. Census, U. S. in five Divisions.....
XIII. Wheat, U. S. in five Divisions.....
XIV. Corn, U. S. in five Divisions.....
XV. Wealth, National.....
Dimick, W. of Township in Government Survey.....
Distillers (see Manufactures).....
Dogs (or Sheep).....
Donaldson, Pass.....
Douglas, Stephen A.....
Drake, Dr. Daniel.....
Drake, Hon. E. F.....
Drake, Sir Francis.....
Drummond, Willis, Jr.....
Drummond's Island.....
Dubuque, Julien.....
Durham.....
Duty, Water.....

E

"Earth and Man".....
Edinburgh Review.....
Education (see under each State and Territory, and Tables).....

PAGE

Education—
Normal Schools...135, 191, 294, 347, 318, 316, 322, 360, 542
Edwards, Ninian 199
Eldorado 372, 380, 410
Emigration 201
Emigration Aid 333
England 30, 309, 441, 570
English 191, 317, 550
Europe 15, 19, 25, 27, 37, 295, 294, 301, 318, 322, 509

(For European Countries, see Diagrams and Tables).
Exemption Laws 354, 423
Exports (see Tables).

F

Factory, Butter and Cheese, (see under separate States, and Manufactures).
Failures 26, 28
Fairbank, B. K. 194
Falls of St. Anthony 257, 264, 265, 548
Falls of St. Mary (see Sault Ste. Marie) 210
Falls of the Ohio 200
Farmers' Institute 313, 356, 576, 577
Farms ..... (see under each State and Territory).
Fauna (see under each State and Territory) 191
Feeble Minded (see Education) 363
Field, The 110
Filson, Mr. 344
Finance 569
Fink (see W. D. T. Tables).
Fire Department (see tables of City Debts).
Fish—
Bass 321, 253, 277, 331
Buffalo 321
Carp, German 324, 277, 321
Catfish 321
Cisco (Siskawit) 321
Eels 321, 277
Muskallonge 321, 355, 321
Perch 316
Pickerel 321
Pike 324, 277, 321
Salmon 321, 403, 404, 405, 349
Shad 321
Sturgeon 321, 277
Sucker 321
Sunfish 324, 321, 321
Trout 321
Whitefish 164
Fish Culture 177
Fisher, Secretary 333, 503, 502
Fisheries 20, 46, 47, 152, 404, 405, 503
Fishermen 19
Fishing Fall 403
Fissure-Veins (see Mining) 174, 215, 251
Flax 295
Flax Seed 333, 503, 502
Flora (see under each State and Territory).
Florida 333, 503, 502
Flour (see Manufactures and Tables).
Food, Cost of 10, 12, 294
Foreign Population (see Population) 26
Forest 361
Forest Fires 13, 15, 200, 203, 254, 400 450
Forests 103
Fort Dearborn Massacre 575, 576
Fortnightly Review 576
Forts (see Cities and Towns).
France (see Diagrams) 18, 28, 61, 143, 167, 297, 303, 356, 396, 479, 509, 544
Franciscan 550
Fremont, John C. 324
French 189, 277, 295, 304, 330, 361, 354
French, Prof. 103
Fruit (see under the separate States) 174, 215, 216, 260, 303

Furnas, Robt. W. 397, 361
Furniture (see Manufactures) 49, 50, 575
Fur Trade 314

G

Gadsden Purchase 447
Galpin, Dr. S. A. 279

PAGE

Gannett, Henry C. 4, 503
Gate of the Mountains 412, 414
Gear, Gov. 324, 353
Gentile 442, 443
Geology (see under each State and Territory).
Azoic 159, 160, 209
Carboniferous 198, 276, 302, 325, 327, 331, 332, 403, 404
Cincinnati 198, 199
Clinton 198
Corniferous 198
Cretaceous 275, 295, 299, 351, 391, 399, 416, 420, 443, 445, 455, 505
Dakota 295, 303
Devonian 161, 299, 375, 310
Drift 295, 295
Eozoic 439, 459, 505
Fossils 295, 327
Granite 295
Hamilton 299
Helderberg 198, 299
Hudson 198
Huron 198, 299
Jurassic 327, 303, 429, 451
Keokuk 327
Laurentian 198, 295
Loess 299, 350
Niagara 198, 198
Niobrara 295, 299
Permian 351
Pliocene 295, 295
Post-Tertiary 295
Potsdam 299
Quaternary 294
Silurian...124, 126, 159—169, 276, 300, 304, 416, 420, 454, 459, 460, 505
Sub-Carboniferous 299
Tertiary 351, 391, 399, 404, 423, 434, 434, 439, 443, 505
Trenton 198
Triassic 451
German (see Diagrams) 317, 321, 509, 541, 527
Germany 30, 23, 61, 93, 235, 309, 355, 441
Geysers 425, 428
Gibson, "Chinese in America" 510
Gillott, Joseph 10
Glass (see Manufactures) 51, 182, 313, 527
Glucose 397
Gold and Silver Mines, Birds-eye View (see Mines, also Appendix).
Goode, Prof. G. Brown 13, 210, 488
Goodhue, James M. 309
Grain (see Cereals and Tables).
Grand Cañon 429, 427, 456
Grand Chain 158, 159, 163
Grand Prairie 199
Grant, The San Pedro 428
Grape Sugar Works 538
Grasshoppers 370
Gratiot, Brig. Gen. C. 534
Gray Cap 468, 470
Grazing 373, 415, 468, 443, 504
Great American Desert 330
Great Basin 30, 420, 427, 428, 470, 481, 492, 498, 495
Great Bend 324
Great Britain (see Diagrams) 30, 61, 95, 257, 303
Great Falls 412, 489
Great Plains 30, 295, 324, 330, 468
Great Salt Lake 421, 433, 438, 471
Great Salt Lake Desert 471
Great Valley 468, 505
Greece (see Telegraph Diagram).
Grindstones 307
Guadalupe Hidalgo, Treaty of 440, 447, 498, 495, 511
Gulf of California 330
Gulf of Mexico 330
Gulf of St. Lawrence 295
Guyot, Arnold 307, 317, 376, 541
Gypsum 307, 317, 376, 541

H

Hall, W. H. 87
Harmar, General 118, 139
Harrison, Wm. Henry 139

PAGES

Hayden, F. V. 322, 377, 379, 389, 416
Health (see under each State and Territory) 549
Heart Lake 422
Hennepin, Louis 161, 207, 208
Henry, Patrick 168
Herding (see under separate States and Terr.)
Herd Law 277
Hetchy-hetchy Valley 436
High Plateau 427, 428
Hiltell 499, 506, 509, 515
Hogs (see Live Stock, and under each State and Territory).
Holland (see Diagrams) 19, 61, 68
Honey 177, 311, 327
Horses (see Live Stock, and under each State and Territory).
Hot Springs 425, 493, 494
Hough 301
Hudson's Bay 260, 267
Huron, Lake 198, 197
Hussey, John 108

I

Ice 543, 561
Idaho (see Territories) 397, 403, 430, 438, 465, 466, 470, 479
Agricultural Products 438
Area 430
Banks 465
Cities—
Boise City 434, 435
Florence 435
Fort Boise 435
Fort Hall 435
Fort Lapwai 435
Idaho City 435
Lewiston 435
Malade City 435
Silver City 435
Climate 439
Counties, Population of 466
Elevation (table) 430, 431
Fauna 433
Flora 433, 453
Geology 434
History 435
Indians 439
Lumber 435
Manufactures 435
Mormons 439
Population 439
Railroads 434, 435
Rivers 433
Silver 434
Surface 431
Taxation 435
Three Buttes 431
Timber 433
Wealth 435
Illini 139
Illini, River of 139
Illinois ..... 31, 76, 77, 137, 150, 197—194, 213, 269, 275, 303, 307, 313, 315, 357, 582, 580, 606, 607, 676, 677, 691
Agricultural Products 180, 171, 172
Area 197
Canals 188, 189, 194, 194
Cereals 171
Cession by France 197
Cession by Virginia 168
Churches 189
Cities and Towns—
Alton 174, 180, 181, 197, 189, 593, 591
Aurora 197, 189, 626
Belleville 180, 197, 189, 627
Bloomington 181, 197, 189, 631
Cahokia 197, 168
Cairo 127, 165, 181, 197, 189, 627, 661
Centralia 193, 174
Champaign 193, 191
Chicago 32, 50, 120, 161, 166, 169, 175, 179, 180, 181, 182, 188, 185, 187, 189, 191, 193, 194, 197, 198, 201, 241, 242, 265, 313, 332, 334, 335, 513, 519, 562, 563, 580, 579, 580, 581

Illinois—
PAGES
Cities and Towns—
Chicago, "American Venice" 584, 588, 589, 573
Cobden 174
Cleve Coeur 168
Cuba 193
Danville 181, 197, 189, 627
Decatur 197, 189, 627
East St. Louis 197, 189, 627
Elgin 188, 197, 189, 627
Fort St. Louis 197
Freeport 197, 189
Fulton 189
Galesburg 197, 189, 627
Harlem 189
Howlett 193
Hyde Park 193
Jacksonville—"Athens of the West" 197, 189, 627, 631
Joliet 181, 197, 189, 627, 631
Kaskaskia 168, 169
Lake 193
Lake View 193
La Salle 197, 189
Merodosia 189, 627
Moline 181, 197, 189, 627, 633
Nauvoo 189, 640
Ottawa 197, 189, 627
Peoria 167, 180, 181, 193, 197, 189, 627, 633, 637, 638, 671
Peru 189
Quincy 180, 189, 197, 189, 633, 641
Rockford 189, 197, 189, 639
Rock Island 188, 181, 197, 189, 627, 633, 644, 651
Shawneetown 193
Springfield 168, 189, 193, 197, 189, 519, 593, 649
Vandalia 519
Climate 193
Coal 197, 180
Commercial 197
Cotton 173
Counties, List of, Wheat 178
Counties, List of, Milling 180
Dairy 174, 179
Debt 189, 193
Drain Tile 178
Education 207
Fauna 164
Fruit 174
Geology 115, 169
Health 165, 193
History 168, 179
Iron Rails, (manufacture) 179
Jurisdiction on the Ohio 193
Land 185, 193
Lumber 193
Manufactures 176, 193
Mounds 193
Newspapers 191, 193
Population (table) 27, 179
Railroads 179, 193
Revolutionary War 197
Rivers 193
Salt 193
Schools 188, 191, 207
Slavery 197
Soil 193
Summary 193, 194
Surface 193
Timber 165, 193
Wages 179
Wealth 188, 193
Wool 178
Zinc 193
Illinois Agricultural College 193
"Illinois, Les des" 193
Illiteracy 195, 201
Immigration 35, 244, 264, 271, 287, 404
Imports (see Commerce under States and Cities)
Income of Nations 24, 27
India (see R. R. Diagrams)
Indian Relics 544
Indian Territory 4, 36, 262, 267, 268, 269, 270, 277, 278, 279, 282

Indiana Territory 202, 204
Indian Treaty 206
Indiana 80, 81, 118, 122–128, 137, 204, 577, 618, 620, 622, 623, 625, 626, 628, 630, 632
Agricultural Products 141, 142
Banks 141
Canals 140
Cereals 141
Cession by Virginia 108, 109
Churches 134
Cities and Towns—
Bloomington 125
Cambridge 607
Casseville 134
Charleston 134
Evansville 150, 152, 154, 618, 623
Fort Wayne 109, 112, 122, 154, 156, 623
Hanover Landing 134
Indianapolis 127, 128, 152, 154, 619, 620, 622, 623
Jeffersonville 152, 154, 620, 623
Lafayette 127, 152, 154, 155, 626
Large Cities 623
Lawrenceburg 152, 607
Leavenworth 134
Logansport 152, 154, 623
Madison 134, 152, 159
Michigan City 123, 127
New Albany 152, 154, 620, 623
Portland 143
Port St. Vincent 623
Richmond 152, 154, 623
Rome 135
South Bend 126, 152, 159, 154, 623
Terre Haute 126, 152, 154, 155
Vernon 607
Vincennes 127, 129, 152, 154, 157, 160, 619, 620
Williamsport 135
Climate 127, 136
Coal 135, 136
Commercial 143, 149
Counties—
Coal 136
Tobacco 144
Wheat 143
Dairy 145
Debt 152, 153
Education 154, 155
Elevation 134
Fauna 137
Flora 136
Fruit 143
Geology 134
Health 135
History 139, 140
Iron Manufacture 179
Live Stock 142, 143
Manufactures 145, 149
Population 81, 140, 155, 156
Railroads 150
Slavery 140
Surface 133
Taxation 153
Timber 138
Wealth 145, 151, 153
Wine 143, 144
Wool 142
Indians 164, 166, 168, 169, 313, 397, 575, 624, 626, 628, 573, 618, 627
Arapahoes 395, 425
Arikarees 407, 408
Apaches 408, 481, 482
Assiniboins 418
Bannacks 425, 426, 428
Blackfeet 418
Blood 418
Cheyennes 395
Chimehaevs 482
Chippewas 253
Coahuila 482
Coeur d' Alene 482
Cocopa 482
Crow 418
Dakotas 395, 397, 407, 408, 418
Delawares 253

Indians— Page
Diggers 446, 477
Flatheads 418
Foxes 169, 253, 279
Gros Ventres 407, 408, 418
Hualapai 482
Iowas 279
Kickapoos 253
Kootenai 418
Mandans 407, 408
Maricopa 482
Modocs 481
Mojave 482
Moquis 482, 483
Navajoes 453
Nez Perces 426
Omahas 277
Papago 482
Pend' Oreille 418
Piegan 418
Pima 482
Ponces 277
Pueblo 482
Sacs 169, 253, 279
Shoshones (see Snake) 418
Sioux 395, 397, 407, 418, 425
Snake 426, 477
Spokane 426
Utes 395, 425, 446, 482, 477
Winnebagoes 253
Wyandottes 253
Yakimas 426
Yuma 482
Industrial Schools 249
Industrial Products 15, 17, 20
Infirmary, Eye and Ear 191
Insane 181, 191, 254, 260, 275
Insurance (see Tables) 59
Internal Revenue (see Tables) 56, 60, 287
Introduction 5, 6
Iowa (see Prairie States) 157, 213, 232, 259, 272, 295, 310, 318, 322, 331, 345, 353, 356, 395, 405, 407, 519
Agricultural Products 280, 281
Area 273
Banks 280
Canals 280
Churches 283
Cities (table) 280, 281
Cities and Towns—
Adair 566
Alta 566
Arcadia 566
Burlington 275, 283, 280, 281, 283, 344, 351, 352, 353, 359
Cedar Rapids 284, 285, 350, 351
Clinton 272, 277, 283, 351
Council Bluffs 275, 280, 281, 283, 344, 345
Creston 359
Davenport 275, 283, 281, 344, 350
Des Moines 275, 280, 281, 513, 542
Dubuque 283, 284, 275, 277, 280, 284, 287, 513, 522, 544, 550, 553, 597
Fort Madison 275
Iowa City 275, 519
Lansing 327
Large Cities 283, 344
Lyons 283, 344
McGregor 283, 349
Muscatine 283, 321, 344
Ottumwa 280, 321, 344
Ruthven 283, 359
Sioux City 281, 287, 357, 359
Climate 275, 274
Coal 275, 278, 297
Dairy 276, 283, 284
Debt 280
Education 283
Fauna 277
Flora 276
Fruit 281, 283
Gardening 281, 283
Geology 275, 276
Government 275, 279
Gypsum 277
Health 275, 274

Iowa— PAGE
History 277, 279
Immigration 284
Live Stock 283, 284
Lumber 287
Manufactures 284, 285
Oatmeal 287
Population (table) 31, 280
Poultry 284
Railroads 283, 286, 294
Rivers 273, 278
Soil 278
Steamers 289
Tax 290
Timber 278
Tree Planting 278
Wealth (table) 289, 291, 294
Ireland 289, 296
Irish 291, 317
Iron (see Tables and Manufactures) 31, 32, 33
130, 161, 166, 209, 249, 290, 311, 312,
491, 496, 507, 541, 547, 608
Bessemer Steel 179, 312
Ore 135, 160, 162
Rails 47, 179
Iron Resources of the U. S. 48
Isle Royale 196
Italy (see Diagrams) 18, 20, 51, 68

J

Jackson, Andrew 320
Jackson's Hole 441
Jenney, Hon. Wm. 316
Jerome 310, 316, 319
Jewett 262
Jesuits 410, 445, 490, 491
Jetties 261
Johnston, Andrew 325
Johnston, Harrison 349
Joliet, Ill. 262, 263, 309
Jones, Commodore 491
Jones, Wm. P. 6
Jornada del Muerto 20
Jute 259

K

Kaibab plateau 456
Kansas (see Prairie States) 206, 209, 211,
226—240, 250, 254, 255, 257, 272,
459, 504, 518, 573, 597, 598
Agricultural Products 234, 235
Area 229
Banks 241
Cereals 234, 235
Churches 244
Cities and Towns—
Atchison 242, 243, 274
Cherokee 237
Chetopa 238
Fort Riley 239
Junction City 239
Large Cities 243, 310
Lawrence 237, 239, 243, 245
Leavenworth 237, 239, 243, 281, 282, 243, 249
Monotony 239
New Pittsburg 237
Syracuse 238
Topeka 243, 249
Wichita 249
Climate 231, 232
Coal 236, 237
Commerce 213
Cotton 235
Counties—
Coal 236, 237
Spring Wheat 239
Winter Wheat 237
Crop 234, 235
Dairy 237
Debt (tables) 243, 245
Education 244, 245
Fauna 233, 251
Free State Struggle 246
Fruit 235

Kansas— PAGE
Geology 235, 236
Gypsum 236, 237
Health 232
History 237
Immigration 241
Indians 242
Iron 237
Lead 237
Live Stock 234, 235
Manufactures (table) 236, 239
Newspapers 243
Population (table) 31, 234
Railroads 240, 241
Rivers 232, 233
Salt 237
Soil 233, 235, 236
Surface 230, 231
Taxation 241, 242
Timber 232, 233
Wealth 241, 242
Wheat, Winter 231
Zinc 237
Kansas and Nebraska Act 254
Kentucky 139, 157, 166, 220, 241, 320
Keweenaw (canal) 219
Keweenaw River 195
King, Clarence 356, 359
Knapp, H. S. 316
Knox, Hon. John Jay 56, 243

L

Laclede, Pierre 252
Lagrange 10
Lake of the Woods 220
Lakes—
Erie 124, 125, 150, 154, 195, 196, 217, 223
Erie, tributaries of 142
Michigan ..... 157, 158, 166, 193, 194, 202—211, 220,
246, 272, 273
Mono 358, 359
Owens 359
St. Clair 193
Superior ..... 197—196, 218, 223, 225, 226, 227, 228,
253, 254, 256, 518, 525, 542
Traverse 210
Vieux Desert 225
Winnebago 225
Land—
Commissioner United States 253, 256
Grants (canal) 253
Grants (railroads) 253
Offices, list of 253, 271, 272
State and United States .. 177, 178, 184, 217, 240,
271, 310, 312, 345, 351, 353, 371,
372, 376, 397, 573, 574, 577
U. S. Surveys, sales, grants, meridians, base lines, townships, sections, land warrants, bounty scrip, swamp lands, school lands, homesteads ..... 253—257
Land and Water of the United States, Area of. (see Appendix)
Laramie Plains 439
La Salle, Chevalier de 193, 196, 198, 254, 272
Lava Beds 451
Lawrence University 247
Laws 76
Lead (see Metals) 96, 165, 169, 225, 230, 235, 237,
311, 397, 398, 573
Leguas, Col. J. M. P. 152
Le Hontan 197
Le Sueur 252, 257
Letters Mailed 73
Lewis & Clarke 311, 410
Lewis Lake 439, 473
Lignite 237, 454
Lime 236, 240
Limestone 235, 236
Liquors (see Tables) 121, 124
Little Point Au Sable 195
Livermore Valley 362
Live Stock (see under each State and Territory, Tables and Appendix) 11, 30
Cattle—
Ayrshire 176, 225

Live Stock— PAGE
Cattle—
Alderney 305
Devon 305, 309
Hereford 176, 305, 309
Holstein 176, 305, 309
Jersey 309
Short Horns 305, 309
Hog Cholera 305
Hogs—
Berkshire 305
Chester White 305
Poland China 305
Sheep 304
Swine 304
Llano Estacado 440, 451
Local Government 379
Locomotives 204, 314, 321, 380
Logging 205
London Times 93
Louisiana 127, 293, 508
Louisiana Purchase 377, 394, 395, 396, 397, 400, 430, 468, 479
Lower California 460
Lynde, Wm. P. 541
Lumber (see Manufactures and Tables) 540, 543

M

Mac Farlane, James 135, 161
McGulpin Point 196
Mackinaw Straits 196, 200, 205
Madeira 144
Manitou Islands 204
Manufactures (see under each State and Territory) 514, 535, 536, 547
Maple Sugar 215
Marble 215
Marquette (Father) 217
Marsh, Hon. G. P. 104, 208, 226, 308
Marvine 87
Maryland 408
Massachusetts 319
Mastodon 858, 346, 511, 576
Maumee Bay 325
Maumee Basin 311
"Maumee Terres" (see Bad Lands) 393, 416
Mediterranean 588
Metals, Precious (see Mines and Tables).
Gold 15, 16, 24, 26, 27, 283, 308, 314, 326, 329, 330, 397, 405, 415, 417, 424, 430, 443, 451, 508, 548, 550, 558, 577
Mercury 507, 508, 551
Nickel 230
Silver 96, 97, 310, 320, 326, 311, 326, 373, 393, 395, 397, 405, 415, 417, 424, 434, 443, 451, 497, 508, 536, 540, 548, 577
Tellurium 230
Mexico 393, 447, 491, 497, 521, 545, 560
Michigan 81, 77, 126—326
Agricultural Products 313, 314
Area 195
Banks 200
Boundaries 195
Boundaries Disputed 211
Canal 218, 219
Churches 205
Cities and Towns—
Adrian 219, 221, 223
Allegan 218
Alpena 197, 226
Ann Arbor 221, 223, 540, 556
Bay City 221, 223, 225, 540
Cheboygan 205, 204, 206
Coldwater 204
Copper Falls 190
Detroit 195, 197, 199, 218, 219, 221, 223, 225, 230, 518, 520, 522, 540, 556, 560, 579
Eagle Harbor 197
East Saginaw 221, 222, 540
Escanaba 197, 209
Flint 221, 223, 540
Forestville 196
Grand Haven 197, 199, 218, 204
Grand Rapids 199, 207, 217, 221, 225, 541
Hancock 558
Houghton 558
Ionia 227

Michigan— PAGE
Cities and Towns—
Jakpeming 226
Jackson 219, 221, 223, 541
Kalamazoo 219, 221, 223, 541
L'Anse 218
Lansing 204, 221, 223, 225, 541
London 204, 221, 223, 225, 541
Ludington 205, 204
Mackinac 195, 205
Manistee 218, 219
Marquette 197, 199, 220, 227, 228, 541
Muskegon 205, 206, 221, 223, 541
Ontonagon 197, 199
Oscoda 223
Parma 227
Pontiac 223
Port Austin 223
Port Huron 197, 218, 221, 223, 541
Saginaw City 221, 223, 540
St. Joseph 195, 194
Sturgeon Bay 205
Tecumseh 223
Ypsilanti 223
Climate 199
Coal 198, 205, 219
Commerce (tables) 219
Copper 209, 210
Counties—
Coal 198
Barley 215
Fruit 216
Manufacturing 218
Salt 206
Water-shed 197
Dairy 216
Debt (table) 221, 222, 223, 555
Education 224, 227
Elevation 196
Fisheries 210
Flora 200
Fruit 212, 215, 216
Furniture 217
Geology 198
Gypsum 207
Harbors 197
Health 199, 200
History 210, 211
Iron 209, 210, 217
Lakes 196, 197
Lands 216
Live Stock (table) 216
Lumber 197, 200, 207
Manufactures 215, 217
Mines 198, 208
Newspapers 225
Population (table) 81, 213
Quarries 207
Railroads 219, 220
Revolution 197
Rivers 196, 197
Salt 198, 205
Silver 210
Soil 198
Steamers (table) 219
Surface 196
Taxation 220, 224
University 222, 224
Water Power 197
Wealth 220, 224
Migration of Industrial Centres 193
Milling (see Manufactures) 190, 542
Mineral (see Mines).
"Miner's Inch" 85
Mines 82, 207, 208, 292, 409, 404, 415, 417, 441, 442, 470, 476, 577, and Appendix.
Mines, Particular 473, 508
Minnesota (see Prairie Basin) 82, 270, 320—371, 372, 376, 381, 393, 395, 396, 397, 398, 399, 400, 409, 410, 505, 507, 508, 521, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566,

Minnesota— Page
Cities and Towns—
Belle Plain 322
Cannon Falls 322
Crookston 322
Duluth 321, 322, 323, 327, 328
Fergus Falls 322
Fort Snelling 327, 328
Hastings 322
Lacesboro 322
Minneapolis 322, 323, 326, 328, 329, 330
Northfield 322
Pembina 322, 323
Red Lake 322
Red Wing 322
Sauk Center 322
St. Cloud 322
Stillwater 322, 327, 328
St. Paul 327, 328, 329, 330, 331, 332, 333
St. Peters 327
Winona 322, 328
Climate 323
Commercial 327
Cost of Provisions (table) 324
Counties—
Amber Cane 322
Butter and Cheese 321
Sheep 322
Wealthy 321
Wheat 322
Dairy 321, 322
Debt (table) 330
Education 329, 330
Elevation 320, 321
Farms 322
Fauna 322
Flora 322
Flour Mills 322
Fruit 320, 321
Geology 320
Health 329
History 326, 328
Immigration 322
Indians 327
Lakes 322
Lands 327, 324
Live Stock 321, 322
Lumber 322, 329, 330
Manufactures 315, 317, 322, 329
Massacre 327
Newspapers 329
Park Region 324
Population 31, 322
Trees 320
Quarries 326, 329
Railroads 322, 327
Rivers 322, 329
State Fair 322, 327
Steamers 327
Stone 326
Surface 320, 321
Taxation 330
Timber 322, 324
Tree Planting 322
War, Indian 326
Water Power 324
Wealth (table) 330, 331
Wheat raising (table) 324
Wool 322
"Minor Political Divisions of the United States" 330
Mississippi (State) 132
Mississippi Valley 327, 328
Missouri (see Prairie States) 127, 253, 254, 255, 256, 257, 311, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333
Agricultural Products 330
Area 315
Banks 315
Castor beans 326
Churches 315
Cities (table) 314, 317
Cities and Towns—
Canton 320
Cape Girardeau 322, 329, 330

Missouri— Page
Cities and Towns—
Hannibal 320, 322, 323, 327, 328, 327
Iron Manufactures 311
Jefferson City 321
Joplin 326
Kansas City (see Tables) 321, 322, 323, 327, 328, 327, 328, 329, 330, 331, 332, 333
Kirksville 319
Lexington 320
Louisiana 322, 327
Marion 321
Natural 320, 321
Sedalia 314, 317, 322
St. Charles 314, 317, 322
St. Genevieve 320
St. Joseph 321, 322, 324, 327, 328, 327, 328, 329, 330, 331, 332, 333
St. Louis (see Tables 160, 166) 320, 321, 322, 323, 324, 327, 328, 327, 328, 329, 330, 331, 332, 333
Warrensburg 319
Wellington 319
Climate 315
Coal 320, 321, 322, 327
Commercial 314, 317
Cotton 327
Counties, prices of Land 314, 317
Lead and Zinc 311
Manufacturing 315
County System 319
Dairy 320, 321
Debt (table) 315, 317, 322
Education 317, 319
Elevation 320, 321
Fauna 321
Flora 320
Fruit 320, 321
Geology 320, 321
Health 320, 329
History 320, 325
Iron 161, 173, 320, 311
Land Value 317
Lead 320, 311
Live Stock 320, 321
Lumber 320, 321
Manufacturing 317, 315
Mining 320, 321, 322
Newspapers 322
Railroads 314, 315, 317, 320, 322
Rivers 320, 322
Schools 315, 317
Slavery 320, 324
Soil 327
States 315
Steamers 314
Surface 320, 327
Territory 31, 77, 320, 322
Timber 320
War 324
Wealth 310, 311, 315
Wine 326
Zinc 320
"Missouri Compromise" 325
"Mitchis Saugeenaw" 135
Mojave Desert 404, 407, 408
Mono Valley 408
Montana (see Territories) 403, 406, 409—418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428
Agricultural Products 415
Area 419
Banks 415
Cities and Towns—
Alder Gulch 410
Bannack 410, 413
Bozeman 413
Butte 413
Camp Baker 413
Camp Cook 413
Confederate Stevens 413
Deer Lodge 413, 414
Fort Benton 413, 414
Fort Ellis 413
Fort Shaw 413, 414

Montana—
Cities and Towns— PAGE
Fort Smith 412, 413
Helena 410, 412, 413, 494
Virginia City 413
Climate 409, 412, 415
Counties, list of 417
Debt 413
Elevations (table) 409
Fauna 413
Flora 413
Geology 416
Gold 410, 416
History 409
Indians 413
Irrigation 414
Live Stock 415, 416
Lumber 413, 417
Manufactures (table) 417
Mining 410, 411, 416, 417
Population 417, 418
Railroads 417
Rivers 411, 414
Silver 416, 417
Surface 411
Temperature, Exceptional 415
Timber 413
Vigilance Committee 410, 411
Wealth 418
Mormons 169, 354, 435, 441, 446, 445, 592
Morse, Jedidiah 123
Mountains—
Adams 464
Allegheny 5, 26, 29, 128, 231, 354
Appalachians 250, 251
Baker 464
Big Horn 431, 435
Bitter Root 412, 430
Blackfoot 454
Black Hills 395, 396—400, 402—405, 430, 432, 580
Blue 465, 470—471, 488, 489
Blue Ridge 123
Book Cliffs 366, 436
Bross 389
Calapooya 481
Carriso 456
Cascade 29, 30, 34, 464—467, 480—482, 490, 494, 505
Coast 464, 466, 490, 493, 499, 503, 505
Colorado 387
Great 573
Contra Costa 503
Cordilleras 29
Cœur d' Alène 465
Davidson 476
Diablo 501, 503
Diamond 471
Ecau 473
Elk 372, 376, 388, 390
Front Range 375, 430
Gosi-ute 471
Greenhorn 375
Gros Ventre 431
Hood 464, 481
Humboldt 471
Iron Mountain 200
Kawsesaw 197
Lamanie Peak 494
Range 375, 430
Lincoln 389, 390
Little Rocky 411
Long's Peak 375
Medicine Bow Range 430
Menominee 209
Missouri Range 413
Ozarks 300, 302, 305, 307
Pah-ute 471
Park 375, 390, 422, 494
Range 376 389, 430
Pierce 567
Pike's Peak 355, 375
Pilot Knob 297, 300, 302
Pinal 465
Porcupine 197
Post 426
Rainier 464
Mountains— PAGE
Roan Cliffs 436
Rocky 5, 26, 29, 35, 94, 250, 349, 354, 375, 431, 432
Rogue River 481
Salmon River 481, 494, 495
St. Helen's 464
San Bernardino 494, 495, 507
San Francisco 495, 497, 499
Sangre de Cristo 375, 377, 388
San Juan 375, 376, 379, 388, 394, 395
Sawatch 375, 377, 390
Seminole 494
Shasta 494
Shepherd Mountain 377
Sierra Nevada 26, 30, 34, 471, 493—495, 499, 503, 505, 509
Sierra La Sal 436
Siskiyou 481
South Park 389
Sulphur Hills 422
Sweet Grass Hills 411
Sweetwater 423, 424
Taylor 453
Tetons 431
Three Buttes 451
Toyabe 471
Uinta 389, 427, 436
Umpqua 481
Wahsatch 30, 427—433, 441—443
Washoe 90
Wet 375, 377
Wind River 431, 432
Yellowstone 411, 421, 424, 449
Zuni 449
Mudge, Prof. B. F. 294, 295
Mules (see Live Stock.)
Mulhall 8, 11, 13, 16
Muscatine Island 252

N

Nails 80
Napoleon, Bonaparte 522
Narrow Gauge 445, 571
National Butter, Egg and Cheese Association 294, 295
National Park (see also Yellowstone N. Park) 423
National Road 125, 519, 520
Nebraska (see Prairie States) 60, 213, 214, 230, 235, 242—271, 272, 296, 460, 495, 440, 504, 519, 575, 585, 597
Agricultural Products 250, 251
Area 246
Banks 267
Churches 270
Cities and Towns—
Bellevue 254
Clifton 262
Dixon 251
Fremont 263
Ft. Kearney 250, 254
Hastings 263, 267
Lincoln 250, 261, 265, 269, 519, 549
Nebraska City 254, 265
Ogden 267
Omaha 50, 246, 254, 265, 267, 519, 521, 523, 525, 549
Plattsmouth 254, 265, 267
Ponca 251
West Point 265
Climate 258, 254, 260
Coal 276, 251
Counties—
Corn 261
Fruit 262
Spring Wheat 261
County System 279
Debt 268
Education 269
Flora 253
Fruit 261
Geology 247, 250 251
Health 254
History 254, 255

Nebraska— PAGE
Live Stock (tables) ... 328, 324
Manufactures ... 325
Peat ... 322
Population (table) ... 31, 325, 329
Railroads ... 326, 327
Rivers ... 317, 319
Salt ... 321
Sheep ... 324
Soil ... 319, 327
State ... 325, 326
Surface ... 318, 327
Timber ... 320, 327
Wealth (table) ... 329
"Nebraska, its Advantages, Resources and Drawbacks" ... 329
Negro ... 318, 321
Nevada (see also Pacific States) ... 5, 90, 373, 410, 430, 440, 470—478, 479, 490, 493, 499, 550
Agricultural Products ... 472
Area ... 470
Banks ... 477
Boundaries ... 470
Cities and Towns—
Camp Halleck ... 476
Fort Churchill ... 473
Fort Ruby ... 473
Virginia City ... 96, 100, 411, 418, 477, 550
Climate ... 472
Counties, Population of ... 477
Debt ... 479
Education ... 476
Elevation (table) ... 470, 473
Fauna ... 473
Flora ... 473
Geology ... 474
Gold ... 475, 476
History ... 470
Irrigation ... 473, 478
Manufactures ... 476, 477
Mining ... 470, 474, 476
Population (table) ... 477
Railroads ... 477
Rivers ... 473
Surface ... 470, 471
Taxation ... 476
Wealth ... 476
Newberry, Professor ... 45, 49
New England ... 50, 382, 576, 576
New France ... 107, 386
New Jersey ... 212, 385, 577
New Mexico (see Territories) ... 364, 373, 404, 447—454, 550
Agricultural Products ... 450, 451
Area ... 448
Banks ... 456
Cities and Towns—
Albuquerque ... 453
El Paso ... 448
Fort Bayard ... 456, 459
Fort Craig ... 449
Las Vegas ... 459
Santa Fe ... 381, 453, 574
Silver City ... 456, 458
Climate ... 450
Copper ... 452
Counties, Population of ... 456
Debt ... 454
Elevation ... 448
Fauna ... 450
Flour ... 454
Forests ... 450
Geology ... 451, 452
Gold ... 452
History ... 447, 448
Indians ... 452
Irrigation ... 449, 451
Land Grants ... 453
Live Stock ... 451
Lumber ... 454
Mining ... 452
Population ... 453
Railroads ... 402
Rivers ... 449
Ruins ... 452

New Mexico— PAGE
Silver ... 452
Spanish ... 447, 448
Surface ... 448
Taxation (table) ... 454
Timber ... 448, 450
Wealth (table) ... 454
Newspapers (see States separately) ... 74
New York (State) ... 386, 512
New York World ... 552
Nicollet, John ... 388
Nimmo, Joseph, Jr. ... 277, 282
Nordhoff ... 514
Normal Schools (see Education).
North Carolina ... 180, 182
North, S. D. N. ... 74
Northwest Territory ... 111, 188, 196, 197, 210, 211, 222
Northwestern Lumberman ... 282
Norwegians ... 201, 317

O

Oats (see Agricultural Products).
Oatmeal (tables) ... 277, 549
Ochre ... 281
Ohio (see Prairie States) ... 109—113, 196, 213, 227, 321, 513, 533, 535, 552, 553, 566, 567, 568
Agricultural Products ... 114, 115
Area ... 101
Banks ... 126
Boundary Dispute ... 211
Building Stone ... 116
Canals ... 124
Cession by Great Britain ... 109
Cession by Virginia ... 109
Churches ... 1, 134
Cities and Towns—
Akron ... 126, 535, 536
Athens ... 556
Bellaire ... 556
Canton ... 126, 535
Chillicothe ... 126, 128, 556
Cincinnati ... 110, 111, 126, 128, 317, 510, 531, 532, 533, 535, 536
Cleveland ... 103, 126, 128, 129, 513, 531, 532, 533, 535, 536
Columbia ... 111
Columbus ... 126, 127, 128, 531
Dayton ... 126, 128, 556
Defiance ... 127, 128, 556
Eastport ... 556
Granville ... 556
Hamilton ... 126, 556
Ironton ... 556
Lancaster ... 556
Large Cities ... 127, 531
Lima ... 556
Lousaville ... 111
Manhattan ... 556
Mansfield ... 556
Marietta ... 111, 113, 556
Milan ... 556
Norwalk ... 556
Oberlin ... 556
Portsmouth ... 126, 128, 556, 559
Sandusky ... 106, 126, 128, 129, 531, 532, 533
Springfield ... 126, 128, 556
Steubenville ... 126, 127, 556, 559
Tiffin ... 556
Toledo ... 106, 126, 128, 129, 511, 531, 532, 533, 535, 536, 573
Urbana ... 556, 557
Youngstown ... 126, 556
Zanesville ... 126, 128, 556, 559
Climate ... 103, 109
Coal ... 115, 116, 121
Commercial ... 120, 130
Counties—
Coal ... 116
Iron ... 119
Manufacturing ... 130, 131
Petroleum ... 119
Salt ... 119

Ohio—
Counties—
Stoneware ... 119
Water Cement ... 119
Dairy ... 116, 117
Debt ... 167, 180
Education ... 110, 118, 120, 130
Fauna ... 106, 107
Fish ... 120, 125
Fruit ... 116
Geology ... 103, 104
Health ... 107, 108
History ... 109, 113
Indians ... 112
Iron ... 119, 120, 179
Live Stock ... 117
Manufactures ... 121, 122
Newspapers ... 130, 131
Petroleum ... 115
Population (table) ... 114
Principles of Government ... 113
Railroads ... 125
Rivers ... 103
Salt ... 119
Steamers ... 124, 125
Surface ... 101
Taxation ... 126
Timber ... 104, 105
Vessels ... 125, 218
Wealth ... 126, 128
Wine ... 116
Wool ... 117, 118
Ohio Company ... 110
Ohio Falls of ... 149
Ohio Gazetteer ... 128
Ohio, Statistics ... 558, 559
Oil Wells ... 558
Ordinance of 1787 ... 109, 113, 140, 167, 211
Oregon (see Pacific States) ... 397, 399, 429, 430, 434, 462, 465, 479—480, 490, 494, 575, 598, 599
Agricultural Products ... 482
Area ... 480
Cities and Towns—
Astoria ... 463, 552
Portland ... 100, 465, 552
St. Helen ... 482
Climate ... 482
Coal ... 489
Copper ... 489
Counties, Population of ... 494
Elevation (table) ... 480
Fisheries ... 493
Geology ... 488, 489
Gold ... 489
History ... 479, 480
Iron ... 489
Land ... 483
Live Stock ... 494
Manufactures ... 469, 497
Mining ... 488
Population ... 493
Railroads ... 495
Rivers ... 483
Silver ... 489
Surface ... 480, 482
Taxes ... 494
Volcanoes ... 488
Wages ... 494
Wealth ... 494
"Origin of Railroads" ... 84
Osage Orange (hedge) ... 163
Owen, David Dale ... 555
Owens Valley ... 502
Owyhee District ... 494
Oxen (see Live Stock).

P

Pacific Coast ... 550
Pacific Ocean ... 5, 480, 482, 483, 490, 492, 493, 553, 575, 594, 595
Pacific Slope ... 26
Pacific States ... 94—100, 395, 598
Artesian Wells ... 90
Cereals ... 99
Irrigation ... 97
Manufactures ... 100, 395, 598
Pacific States—
Railroads ... PAGE 100
Packing (meats) (see Tables) ... 542
Paine, Byron ... 554
Pajaro Valley ... 501
Park, Baker's ... 390
North ... 375, 397
Middle ... 375, 395, 397
San Luis ... 375
South ... 375, 394, 397
Parks (see City Debt tables; Yellowstone National Park) ... 354
"Pastoral Marvels" ... 363
Patterson, R. H. ... 94
Peat ... 162, 224, 227
Penitentiary (see in each State, also States Prison) ... 191, 224, 245, 269
Pennsylvania ... 179, 209, 269, 580, 558, 578
Peoria Lake ... 159, 166
Peoria Sugar Refinery ... 583
Petroleum ... 36, 113, 227, 580, 531
Pinet, Father ... 166
Pioneer Press ... 220, 265, 267
Placer (mine) ... 408, 410, 411, 452, 489, 506, 508
Plateau, Cordilleran ... 29
Du Coteaux des Prairies ... 272
Region ... 29
Platte Mound ... 295
Plows ... 50
Point aux Barques ... 207
Poland ... 269
Political Code ... 313
Polygamy ... 582
Pools ... 573
Poor's Manual ... 267, 269, 560, 580, 597
Population (see Tables, also Appendix)—
Center ... 28
Elevation ... 28
Growth ... 25
Native or Foreign ... 28
Sex ... 28
Temperature ... 28
White or Colored ... 28
Portage Lake ... 219
Porter, R. P. ... 6
Portugal (see Diagrams).
Portuguese ... 490
Postoffice ... 242
Potter, O. W. ... 555
Potter's Clay ... 311
Pottery (see Manufactures) ... 262
Poultry ... 177, 223, 224, 310, 327
Powell, Major J. W. ... 54, 381, 412, 458, 468, 482, 555
Prairie ... 351
Prairie States (see Diagrams and Tables) ... 20, 75, 224, 552
Principal Meridians ... 686, 593
Progress of Western Cities ... 6
Pueblos (Villages) ... 447, 453
Puget's Sound ... 465, 469
Pulpit Rock ... 295
Pumpelly, R. ... 22
Purdue University ... 135
Purdy, T. C. ... 241
Purposes of Debt (see Tables).
Putnam, Gen. Rufus ... 110, 194
Pyramid Lakes ... 477

Q

Quartzite ... 207, 217
Quebec ... 208
Queen Elizabeth ... 490

R

Railroad Land Grants (see R. R. Chapter) ... 186
"Railroad Problem, The" ... 577
Railroads (see under each State and Territory, also Diagrams and Tables) ... 85, 554, 568, 564, 570, 571, 593
"All Rail" ... 590
Atchison & Nebraska ... 307
Atchison, Topeka & Santa Fe ... 194, 232, 241, 574, 575, 592
Atlantic & Pacific ... 441, 596

Railroads— PAGE
Burlington & Missouri River....268, 272, 273, 561, 568, 569, 572, 598
Baltimore & Ohio.....20, 531
Canadian Grand Trunk.....600
Central Pacific...417, 444, 445, 471, 477, 514, 574, 575, 598
Chicago, Alton & St. Louis.....561
Chicago Burlington & Quincy.176, 561, 568, 573
Chicago, Columbus & Indiana.....151
Chicago, Clinton, Dubuque & Minnesota.....569
Chicago & Eastern.....176
Chicago, Milwaukee & St. Paul...176, 560, 565, 569, 600, 573
Chicago & West Michigan.....220
Chicago & North-Western.....176, 560, 565
Chicago, Rock Island & Pacific.176, 560, 568, 573
Chicago & St. Louis.....176
Colorado Central.....494
Covington, Columbus & Black Hills.....307
Denver Pacific.....494, 502
Detroit, Grand Haven & Milwaukee.....220
Detroit, Lansing & Northern.....220
Detroit, Mackinaw & Marquette.....217
Eureka & Palisade.....477
Flint & Pere Marquette.....205, 206, 205
Fort Scott & Gulf.....307
Fremont, Atchison & Nebraska.....307
Galena & Chicago Union.....185
Grand Rapids & Indiana.....220
Illinois Central...68, 170, 176, 186, 194, 561, 569, 586, 591
Kansas Pacific.....574
Keokuk, Ft. Des Moines & Minnesota.....560
Lake Shore & Michigan Southern.151, 220, 569
Leavenworth, Lawrence & Galveston...307, 598
Madison & Indianapolis.....527
Mad River & Sandusky City.....526
Michigan Central.....151, 186, 219, 220, 526, 560
Michigan Southern.....219, 220
Milwaukee & St. Paul.....560
Missouri River, Fort Scott & Gulf.....307
Missouri, Kansas & Texas.....598
Missouri Pacific.....561, 591
Nevada Central.....477
Northern Cross.....185
Northern Pacific.....307, 681, 403, 405, 407, 417, 507, 567, 598
Northwestern & Grand Trunk.....220
New York Central.....20
Omaha & Northern Nebraska.....307
Pacific.....410, 445, 598
Pittsburg & Ft. Wayne.....151
Sioux City, Chicago & St. Paul.....573
Sioux City & Pacific.....307, 598, 573, 598
St. Paul, Minneapolis & Manitoba.....565
St. Paul & Pacific.....568
Southern Pacific.....194, 241, 461, 574, 598
Texas & Pacific.....598
Union Pacific...240, 241, 257, 258, 263, 277, 271, 272, 417, 419, 420, 434, 445, 446, 543, 592—598, 574, 594
Utah (see list, p. 445).....417, 445
Utah & Northern.....417, 494
Virginia & Truckee.....477
Wabash System.....560
Wabash, St. Louis & Pacific.....151, 185
"Railroads and the Farmers".....595
"Railway Age".....593
Rainy Lake.....220
Ranch.....262, 264
Randolph, Charles.....188, 595
Range, Stock.....597
Rebellion (see War).
Reform School.....224
Religion.....220
Revolutionary War.....167, 517, 595
Rice, Wild.....526
Rinault, Philip Francois.....167
Rivers—
Alamo.....509
Alisos Creek.....201
Amador.....203
Amargosa.....202
Arkansas...224, 225, 231, 257, 274, 276, 282, 283, 287, 292, 302, 543, 567

Rivers— PAGE
Au Sable.....166
Bad.....166, 167, 168
Bad Axe.....168
Bear.....421, 434, 445
Bear Creek.....201
Beaver.....215
Beaver Creek.....220
Belle Fourche.....220
Berryessa.....201
Big Black.....220
Big Blue.....220, 225, 302, 303
Big Horn.....221—223
Big Muddy.....185, 189
Big Sioux.....273, 276, 279
Big Thompson Creek.....220
Bitter Root.....412, 414
Black.....166, 220, 220, 225
Blue.....302, 303
Bois Brule.....185, 189
Boise.....420, 425, 429
Box Elder Creek.....220
Brush.....169
Buenaventura.....201
Buffalo.....220
Cache Creek.....201
Cache de Poudre.....220
Calamus.....220
Calumet.....217
Canadian.....443, 449
Cass.....197, 220
Cedar.....197, 274, 275, 281, 291, 543
Chagrin.....169
Chariton.....272, 296, 297, 300, 301, 307, 317
Cheboygan.....197
Cherry Creek.....220
Cheyenne.....409, 494
Chicago.....166, 169, 185, 194, 517, 518, 527
Chippewa.....197, 220, 220, 441
Cimarron.....224, 225
Clarke.....412, 417, 425
Clarke's Fork.....412
Clear Creek.....302, 303, 494
Clear Lake Creek.....201
Clearwater.....420—423, 425
Colorado...231, 427, 428, 443, 450, 455, 458, 459, 493, 502, 507
Colorado-Chiquito.....420, 425, 427, 428, 440
Columbia...414, 412, 417, 425, 427, 428, 429, 430, 431, 434, 435
Coyote.....201
Crow.....220
Crow Wing.....220
Cucharas.....220
Culvre.....220
Current.....220, 225
Cuyahoga.....166, 169, 517, 518, 526
Deer Lodge.....414
Deschutes.....429
Des Moines.....251, 270—272, 273, 282, 283, 291, 292, 295, 296, 297, 300, 301, 302, 303, 305, 306, 307, 317, 318, 320
Des Plaines.....161, 165, 166, 168, 169, 517, 518, 527, 527
Detroit.....166, 169
Dolores.....220
Dry.....201
Eau Claire.....541
Eel.....220
Elkhorn.....245, 246, 250
Embarras.....185
Fevre.....519
Firehole.....221
Flint.....197, 220
Floyd.....220
Fraser's.....220
Frazier.....220
Fountaine qui Bouille.....302, 303
Fox.....156, 161, 166, 167—220, 225, 241, 242, 243, 247, 541, 547
Gallatin.....412, 414, 415, 425
Gasconade.....275, 517
Gila.....420, 425, 427, 428, 429, 430, 431, 434, 435
Grand...166, 195, 197, 206, 220, 274, 275, 276, 280, 281, 282, 283, 287, 292, 295, 296, 297, 300, 301, 302, 303, 305, 306, 307, 317, 318, 320
Grande.....220
Grand Wash.....427

Rivers— PAGE

Grande Ronde ... 466
Great Miami ... 103, 108, 110, 111, 194, 517
Green ... 480, 482, 492, 501
Greene ... 276, 480, 482
Greenhorn ... 353
Gunnison ... 335
Hardscrabble Creek ... 353
Henry's Fork ... 433
Hocking ... 108, 108, 110
Huerfano ... 353
Humboldt ... 471, 473
Huron ... 102, 214, 540, 555
Illinois ... 102, 130, 153, 155, 161, 163, 165, 166, 168, 169, 173, 175, 183, 194, 225, 297, 305, 314, 517, 519, 537, 545, 597, 560, 580, 597, 600
Indian Creek ... 501
Iowa ... 272, 276, 278
James ... 396, 398, 402, 406
Jefferson ... 412, 414
John Day ... 459
Jordan ... 440
Judith ... 411, 413
Kalamazoo ... 196—198, 214, 541
Kankakee ... 132, 138, 139, 142, 158, 166
Kansas ... 297, 304, 394, 395, 531, 537, 547, 548
Kaskaskia ... 156, 166, 197, 173
Kettle ... 353
Kewaunee ... 226
Keya Paya ... 346, 349, 352
Klamath ... 481, 501
Left Hand ... 329
Lewis ... 432, 465
Licking ... 111, 537
Linslow ... 498
Little ... 365
Little Blue ... 339, 340, 352, 364, 586
Little Miami ... 102, 108, 110, 111
Little Missouri ... 407
Little Nemaha ... 349
Little Prickly Pear Creek ... 410
Little Sioux ... 272, 276, 568
Little Scioto ... 109
Long Creek ... 501
Loup ... 347, 349
Mad ... 423
Madison ... 412, 414, 425, 427
Mahoning ... 517, 518
Malade ... 494
Malheur ... 469
Manistee ... 197
Manitowoc ... 226
Mankato ... 278
Maple ... 196, 273
Maquoketa ... 273
Maumee ... 102, 109, 134, 139, 180, 188, 196, 512, 518, 536
Menominee ... 195, 200, 227, 228
Meramec ... 397
Miami ... 108, 110—112, 189, 567, 588
Milwaukee ... 228
Minnesota ... 160, 250—253, 255, 257, 265, 267, 270, 543
Mississippi ... 94, 112, 124, 128, 129, 157, 158, 159, 160, 161, 166—165, 167—169, 170, 173, 183, 184, 194, 201, 227—229, 230, 231, 241, 242, 250—255, 257, 258, 262, 263, 267, 268, 270—274, 276—278, 282, 283, 543, 544, 545, 548, 553, 555, 558, 575, 579, 581, 597, 601
Missouri ... 85, 272, 274, 276—278, 287, 288, 291, 300, 302, 307, 308, 310, 311, 317, 321, 340, 346, 348, 349, 352, 357, 361, 364, 365, 367, 368, 375, 376, 407, 410—413, 414, 515, 528, 530, 544, 545, 547, 548, 555, 562, 569
Mojave ... 495, 503
Monongahela ... 113, 124
Montreal ... 195, 229
Muddy Creek ... 354
Musclebell ... 414
Muskegon ... 197, 215
Muskingum ... 108—108, 110, 119, 533
Nace ... 509
Nemaha ... 349
Neosha ... 364, 551
Nile ... 553

Rivers— PAGE

Niobrara ... 346, 347, 349, 352, 364, 367
Nishnabatona ... 273
Nodaway ... 272, 275
Ohio ... 8, 20, 23, 101—105, 110—112, 119, 124, 128—134, 137—139, 144, 149, 153, 157, 158, 160—169, 168, 169, 180, 214, 517, 518, 530, 531, 535, 537, 538, 580, 590, 591
Ontonagon ... 197
Osage ... 297, 301, 305, 307, 309, 318
Ottawa ... 210
Owyhee ... 433, 434, 469
Payette ... 439
Pecatonica ... 195, 537
Pecos ... 448, 453
Pere Marquette ... 206
Petaluma ... 502
Pine ... 197
Pitt ... 494
Platte ... 346, 348, 350, 352, 359, 360, 364, 374, 420
North ... 354, 430, 432, 433
South ... 87, 374, 375, 388, 353, 397, 398, 549
Pleasant ... 501
Plum Creek ... 275, 283
Pope ... 501
Portage ... 109
Port Neuf ... 434, 436
Powder ... 433
Prairie Creek ... 349
Purgatorio Creek ... 353
Putah ... 501
Raccoon ... 548, 550
Raft ... 433
Rainy Lake ... 250—252, 255
Raisin ... 194, 540
Ralston Creek ... 353
Red ... 250, 258, 265, 266, 267, 270, 271, 295, 296, 309, 402, 405—407, 577
(La.) ... 268
Cedar ... 273
Republican ... 324, 325, 339, 340, 351, 355, 359, 361, 374
Rhine (Europe) ... 253
Rifle ... 305, 308
Rio de Chelle ... 457
Rio Grande ... 324, 445, 446, 539
Rock ... 158, 160—162, 166, 227, 228, 232, 263, 517, 530, 545
Rocky ... 109
Rogue ... 481, 484, 485
Rum ... 253
Russian ... 501
Sacramento ... 50, 481, 482, 484, 496, 576
Saginaw ... 194, 197, 201—204, 205, 210, 226, 215, 225, 540, 541
Saguache Creek ... 354
St. Charles ... 253
St. Clair ... 195, 199
St. Croix ... 227—229, 241, 251, 253, 268, 265, 267, 270, 546
St. Francis ... 226, 227, 237
St. Joseph ... 132, 134, 138, 139, 142, 192—195, 535
St. Lawrence ... 194, 197, 181, 184, 210, 226, 560
St. Louis ... 222, 223, 225
St. Mary ... 133
St. Vrain's Creek ... 353
Salina ... 501
Saline ... 324, 329, 337
Salmon ... 431—433
Salt ... 197, 227, 588
Salt Creek ... 349, 351
San Bernardino ... 501
San Diego ... 501
Sandusky ... 109
San Gabriel ... 501
Sangamon ... 158, 164, 173
San Joaquin ... 80, 493, 494, 495, 575
San Juan ... 335, 446
San Juan Creek ... 501
San Luis Rey ... 501
San Luis Creek ... 354
San Rafael ... 449
San Ramon ... 502
Santa Ana ... 501
Santa Clara ... 501

Rivers— PAGE
Santa Inez 501
Santa Margarita 501
Santa Rosa 501
Sauk 355
Scioto 103, 103, 515, 531
Sevier 443
Sheboygan 329
Shell Creek 349
Shiawassee 197
Short Creek 327, 329
Sioux 373
Six Mile Creek 309
Skunk 373
Smith's 429
Snake 381, 426, 430, 435—437, 479, 525, 557
Smoky Hill 324, 325, 327, 329
Spring Creek 327
Solomon's 324, 326
Sun 414
Sweetwater 422
Tequamenon 197
Teton 414
Thunder Bay 197
Tittibawassee 197, 206
Tongue 423
Tower Creek 429
Trempealeau 293
Troublesome Creek 324
Tuolumne 495
Turkey 373
Turkey Creek 293
Two Rivers 329
Uinta 443
Umatilla 433
Umpqua 481, 483, 498, 579
Uncompahgre 326
Upper Iowa 373
Vermillion 103, 158
Virgen 430, 470, 473
Wabash 124, 125—134, 136—139, 142, 149, 150, 157, 158, 160, 163, 165, 169, 173, 186, 517, 518, 532, 536, 560
Walla Walla 402, 404, 490
Walhondling 556
Wapsipinicon 373
Weiser 433
White 123, 134, 136—138, 143, 206, 207, 402, 407, 517, 518, 529
Whitewater 134, 139, 142, 144
Willamette 80, 481, 529, 538
Williams 354, 440
Willow Creek 354
Wind 421—423, 425
Wisconsin 227—230, 232, 233, 241, 517, 560
Wolf 320
Wood 349, 434
Yamhill 489
Yaquina 489
Yellowstone 398, 411, 412, 416, 417, 425, 426, 433
Youghiogheny 194
Zumbro 305
"Rock City" (rocks) 238
Rock River Valley 169
Roman Catholic (see Churches).
"Round up" 354, 395
Routt, Gov. J. L. 362, 364
Russia (see Europe and Diagrams) 97, 563
Rye (see Tables and Agricultural Products).

S

Saginaw Bay 195
St. Clair, Gov. 111, 113, 139
"St. Francis Bottom" 207
St. Mary, Straits 195
St. Paul 397, 403
Salmon Fall 429
Salt 208, 229, 231, 240
Illinois 170
Lake Desert 470
Michigan 208
New York 208
Springs 119
Sandwich Island (sugar product) 551
San Felipe Valley 538
San Francisco Basin 531
San Francisco Bay 570
San Lorenzo Valley 501
San Luis Park 440
San Luis Valley 440
Santa Clara Valley 538
Sargent, Winthrop 139
Sault Ste. Marie 197
Seward, Fort E. 24
Saw Mills 221—228, 230
Scandinavians 371, 441
Schaller, Hon. John B. 362
Schools (see Education, also Tables) 70, 71, 74
Scotch 371
Scotland 56, 230, 440
Sea of Tiberias 440
Selkirk Settlement 397
Sewers (see Tables, Purposes of Debt).
Shannon, Hon. 318
Sheep (see Live Stock).
Michigan 219
Shoshone Falls 424
Lake 425, 426
Sibley, Gen. 377, 418
Signal Corps 147, 155
Service 321, 322
Silver Islet 238, 240
Silver Smelting 240
Sinaiuewa Mound 302
Sioux Reservation 403, 404
Slade, James P. 150
Slavery, Indiana 140
Smith, Gov. 241
Joseph 354
Smithsonian Institute 373, 400, 413, 418, 459, 464
Snakeheads (R. R.) 427
Snake River Plain 421—423
Snow, Frank H. 321
Soil 242, 250
Soil and Climate 327, 329
Soldiers' Orphans' Home 191
Sorghum 177, 213
South America (see Diagrams).
South Carolina 256
Spain (see Diagrams) 252, 270
Spaniard 252, 321
Spanish 277, 304, 447, 479, 491, 509, 510
Spanish America 97
Spirit Lake 272
Spofford, A. R. 76
Staked Plains 60
Stamp Mills 403, 404
Stanley, Dean 126
State Agricultural College 180
State Agricultural Report 180
State Agricultural Society 226, 261, 277
State Board of Agriculture 240, 261
State Historical Society 189
State Horticultural Society 207, 261
State—
Buildings 319, 324, 330, 333, 361
Library 148
Meteorologist 178
Prison 541, 548
Public Schools 324
Surveyor General 327
University 261, 347, 365, 319, 360
Statistical Atlas 321, 370, 371
Statistician, State (Ind.) 140, 141, 142
Staves 207
Steel (see Iron).
Steel Rails 273
Steinberg, Dr. L. 150
Stone Quarries (Ind.) 136
Straits of Carquinez 532
Sub-humid Region 54
Subsidy 370
Sully, Gen. 377
Surveyor General 327
Sutter's Fort 532
Swamp Lands 139
Sweden (see Diagrams).
Swedes 221, 317
Swine (see Hogs).

PAGE

Swiss 144, 207
Switzerland (see R. R. Diagram).
Symmes, John Cleves 110, 111

T

Table Rock 200
Tables—
Agricultural Productions (see Cereals) 113, 141, 142, 172, 213, 226, 227, 260, 260, 261, 304, 325, 360, 535
Areas 35, 70, 97, 401, 409
Banks 19, 56
National 56
State 56
Bonded Debt, Cities 270, 316, 513
Issue and Maturity 139, 316, 513
Purposes 139, 270, 316, 343, 514
Rate 139, 270, 316, 317, 343, 514
Registered 57, 127
Canals and Railroads 557
Cereals (see Ag. Prod.) 39, 40, 81, 96, 115, 141, 170, 213, 225, 260, 260, 304, 325, 358, 360, 401, 413, 425, 443, 460, 497, 478, 489, 500, 551
Cereals, Acres in 81, 96
Chinese Immigration 511
Cities, Growth of 55
Coal 54
Commerce, etc 19, 582, 585, 546
California 551
Commercial Estimates 485
Comstock Lode 475
Corn 41, 82, 90, 226
Cost, Living 264
Wheat Culture 264
Dairy 261
Debt 70, 197, 260, 262, 294
City 197, 345, 370, 350
Classified 261, 344
Bonds 231
Purposes 135, 232, 342
Rate 135, 233, 343
Issue and Maturity 135, 343
State 64, 84
Debt and Taxation 454
Elevation 374, 425, 430, 451, 497, 449, 455, 464, 472, 480, 498
Exports 488
Education 260, 260
Funds 347
Schools 78, 134, 224, 260, 358
Territories 52
Failures 59
Fisheries 46, 47, 123, 510
Food, Price of 24
Freight Receipts 532
Fruit Trees, California 500
Glass 51
Gold 15
Grain Receipts, and Shipments 530, 530, 547, 552
Distillation 530
Trade 529
World's 15
Humidity 379
Indians 407
Industries 497, 514, 523, 532, 546
Insurance 59
Internal Revenue Tax 530
Irrigation 263
Iron and Steel 21, 22
Land Grants for Canals 593
Railroads 596, 594
Swamps 595
Lead 265
Letters mailed 78
Libraries 70
Live Stock 46, 52, 70, 115, 142, 170, 213, 220, 261, 263, 300, 307, 362, 365, 451, 500
Local Indebtedness 54, 60, 342
Lumber ..... 302—306, 320, 322, 340
Manufactures ..... 48, 58, 91, 100, 146, 149, 240, 264, 302, 320, 330, 362, 400, 417, 425, 445, 454, 495, 497, 514, 524—532, 562, 582, 590, 604
Metals 52, 96, 265

Tables—
Mileage, Railroad 94, 47
Mines—
Bonanzas 475
Quartz 508
Mining Counties, California 508
Newspapers 74
Ore and Grain 123
Population 32, 80, 97, 98, 114, 140, 170, 212, 224, 256, 260, 305, 324, 358, 362, 402, 417, 418, 425, 435, 444, 458, 461, 467, 477
Classified 259
Sex 35, 58, 98
Colored and Foreign 36, 60, 98
Prairie States 81
Wealth and Debt 154, 201, 256
Wealth and Taxation 200
Wealth, Taxation and Debt 198, 199, 199, 222, 245, 270, 317, 343, 393, 448, 477, 487, 513, 516
Precious Metals 83, 96, 97, 261, 508
Progress, World 18
Public Lands, Disposal of 598
Railroads 84, 100, 445
Built 594
And Canals 557
Earnings 532
Freight ..... 563, 565—567, 570, 571, 582
Miles of road 559
Rainfall 377, 399, 413, 429, 433, 472
Salmon Fisheries 498, 505
Salt 340
Spirits 303
Steamers 219, 242, 263
Taxation 66, 126
Classified 344
Land 270
Temperature 376, 400, 412, 428, 459, 472
Timber 126
Tobacco 340
Transportation 260
Valuation 62, 65
Vessels 125, 135
Wages 32, 494, 500
Wealth 68, 197, 260, 342, 407, 454, 461, 484
and Debt 268
Debt and Taxation 269, 415, 478
and Taxation 425, 440, 488
Wheat 11, 41, 45, 88, 96, 226, 401
Wine 12, 144
California 504
Vines 508
Tanner's History of Canals and Railroads 557
Tartary 583
Tax (see Tables).
Taylor R. C 161
Taylor, Zachary 168
Teachers (see Education).
Teachers' Institutes (see Education).
Tehachipi Valley 502
Telegraph (see Diagrams).
Telephone (see Diagrams).
Temple Block 597
Tennessee 348, 362
Territories 5, 8, 79, 94, 210, 211
Texas 90, 335, 336, 341, 364, 372, 376, 447, 448, 504, 573, 579
Thompson, Hon. S. R 309
Thunder Bay 206, 207
Tile Drain 178
Timber (see under each State and Territory).
Culture 320
Culture Laws 595
Tithes 446
Tobacco (see Agricultural Products).
Todd, Col. John 169
Tonti, M 167
Towage 581
Town Government 270, 319
Township, Congressional 588, 591
Transportation (see Vessels, Railroads and Canals) 123
Traverse Bay 190
Tree Planting 163, 258, 276, 303, 333, 595
Turkey (see Diagrams).
Tuthill Salt Marsh 338

PAGE

"Two Years before the Mast"..... 331
Tyler, John (President)..... 378

U

United States (see Diagrams and Tables)..19, 94, 49
Navy..... 401
Engineer Corps..... 410
Union Stock Yards..... 536
University (see Education).
Utah (see Territories)...384, 387, 388, 374, 410, 419, 420, 422, 424, 432—443, 454, 470
Agricultural Products..... 443
Area..... 437
Banks..... 446
Cities and Towns—
Camp Douglas..... 439
Ogden..... 434, 442, 445, 514
Salt Lake City.....439, 442, 445, 446, 505, 506, 507
Climate..... 443
Coal..... 443, 444
Counties, Population of..... 444
Education..... 445
Elevation..... 437
Fauna..... 440
Flour..... 444
Gold..... 443
History..... 440
Indians..... 446
Irrigation..... 442, 443
Live Stock..... 443
Lumber..... 444
Manufactures..... 444
Mormons..... 440, 446
Population..... 444
Railroads..... 442, 444
Silver..... 443
Surface..... 437
Wealth..... 445

V

Vanderbilt, Wm. H..... 576
Vasey, Dr. Geo..... 182
Vasques de Coronado..... 447
Vauban..... 10
Vein, True Fissure (see Mines)..... 474
Vermillion Lake..... 276
Vermont..... 511
Vessels (see Tables)....124, 125, 150, 184, 185, 215, 314, 543
Vigilance Committee..... 410
Vilas, Col. Wm. F..... 393
Virginia..... 397, 398
Cession by..... 180, 185
Vital Statistics (see Health under each State).
Volcanoes..... 426, 434
Von Coelln C. W..... 282

W

Wages (see Tables)..... 94
Waite, Dr. Henry Randall..... 6
Wales..... 441
Walker, Hon. Francis A..... 368, 379
War, Civil..... 33
War of 1812..... 185, 204
Washburn Observatory..... 397
Washington, General..... 125
Washington Territory (see Territories)... 420, 434, 462—470, 472, 480, 482, 484, 486, 511, 522
Agricultural Products..... 467
Area..... 463
Banks..... 468
Cities and Towns—
Bellingham Bay..... 467, 468
Fort Colville..... 463
Gray's Harbor..... 468, 469
Muckilteo..... 469
Seattle..... 466
Shoalwater Bay..... 469
Climate..... 462, 466
Coal..... 467
Counties, Population of..... 465
Fauna..... 463
Fish..... 462, 463
History..... 463
Indians..... 468, 469
Irrigation..... 464
Lumber..... 466
Mining..... 467
Population..... 465
Railroads..... 467
Rivers..... 462
Silver..... 463
Surface..... 464, 467
Taxation..... 465
Temperature..... 466, 467
Volcanoes..... 464
Wealth..... 465
Watch-making, (see Manufactures)..... 488, 489
Water, Cubic feet..... 76
Duty..... 83, 85
Power (see under States)..... 284, 541
Works (see Purposes of Debt in tables.)
Wayne, Gen Anthony..... 113
Wealth of Nations (see Tables and Diagrams). 62
"Webfoot"..... 466
Wells, Artesian..... 76, 80
Wells, Fargo and Co.....391, 482, 483, 474, 508
Welsh..... 391, 317
West, The, defined..... 36, 39, 50
Western Reserve..... 110
West Indies..... 197
West Virginia..... 125, 530, 536
Wheat (see Tables, Diagrams, Agricultural Products and Cereals)..... 11, 62
Spring..... 326, 331
Winter..... 307, 327, 328, 329
Whitford, W. C..... 446
Wilber, C. D..... 327, 356, 360
Williams, Geo. T..... 180
Williams, M. G..... 103
Winchell, Alex..... 308
Wine (see California)..... 142, 144, 503
Wines, F. H..... 191
Winnebago Lake..... 293, 353
Wisconsin (see Prairie States)..... 77, 197, 198, 197—240 257, 275, 293, 295, 303, 304, 305, 307, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348,

Wisconsin—
Counties—
Tobacco 327
Wheat 324
Dairy 176, 330
Debt 344
Education 346, 347
Elevation 327, 329
Fauna 330, 331
Fish 331
Flora 330
Fruit 328
Geology 328, 329
Health 332
History 324
Indians 333
Iron 179, 329
Lead 329, 330
Lumber (table) 220
Manufactures 329
Navigation 341, 342, 343
Newspapers 346
Population (table) 324
Railroads 342, 343
Rivers 325, 341
Steamers 343
Surface 327
Territory 278
Timber 220
Tobacco 327, 328
Zinc 329
Wool 117, 178, 218, 288, 551, 558
Wool Crop of the United States (see Appendix).
World Manufactures (see Diagrams).
World's Progress (see Diagrams).
Worthen, A. H. 160
Wright, A. H. 175
Wright, Chas. E. 309
Wyckoff, Wm. C. 21
Wyoming (see Territories) ..... 90, 346, 349, 356, 397, 403, 408, 412, 419—426, 430, 431, 497, 597
Agricultural Products 422, 423
Area 420
Banks 425
Cities and Towns—
Carbon 424
Wyoming—
Cities and Towns—
Cheyenne 393, 978, 979, 424
Evanston 424
Fort Bridger 419, 425
Fort Laramie 419
Fort Steele 419
Granger 424
Rock Spring 424
Sherman 975, 420
Climate 421, 422
Coal 424
Counties, Population of 425
Elevation (table) 420
Fauna 422
Flora 422
Geology 422, 423
Gold 424
Grazing 423
History 419
Indians 419, 425
Irrigation 423
Live Stock 422
Mining 424
Population 424, 425
Railroads 419, 424
Rivers 421
Silver 424
Surface 420
Taxation 425
Timber 422
Wealth 425
Yellowstone National Park 425, 426

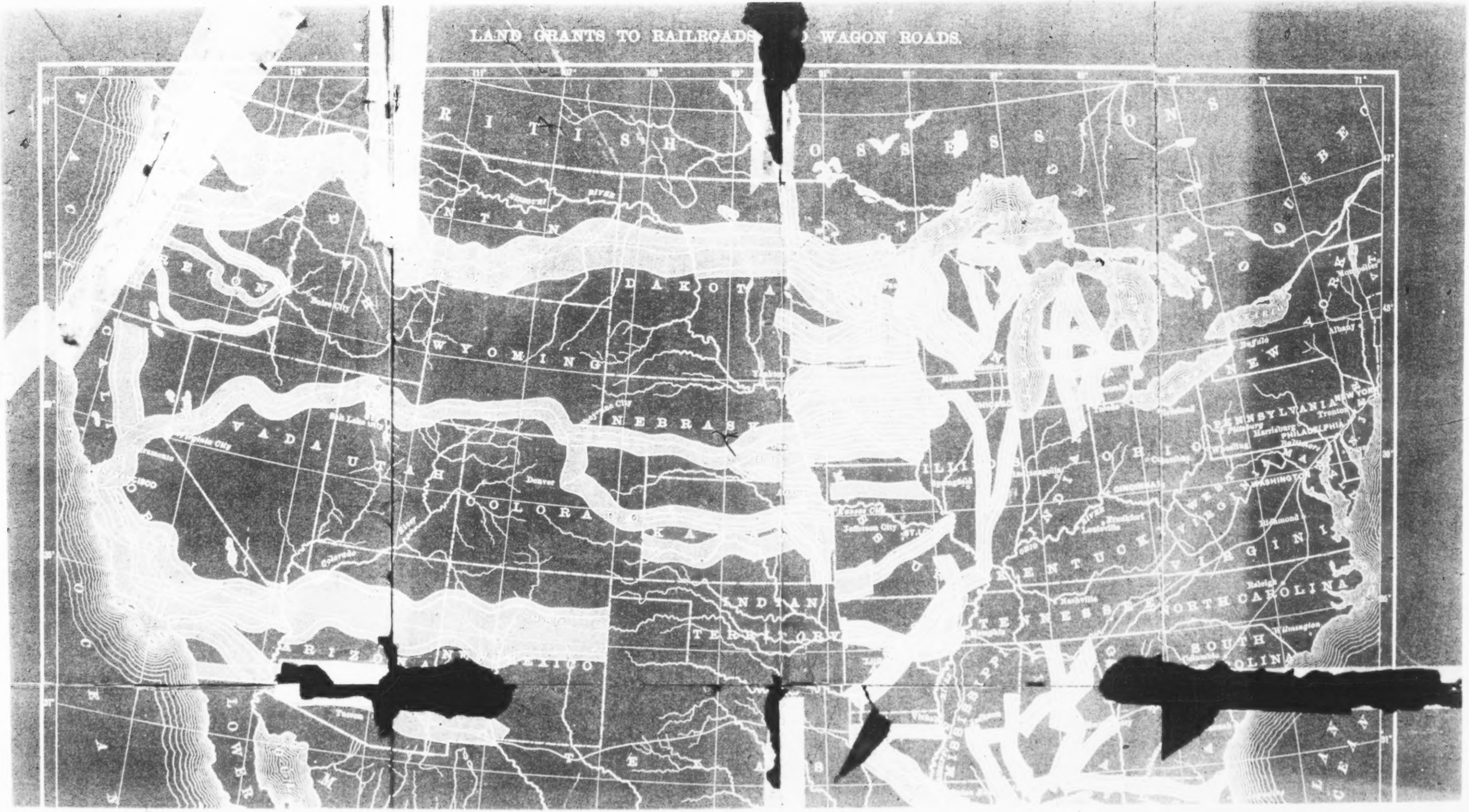
Y

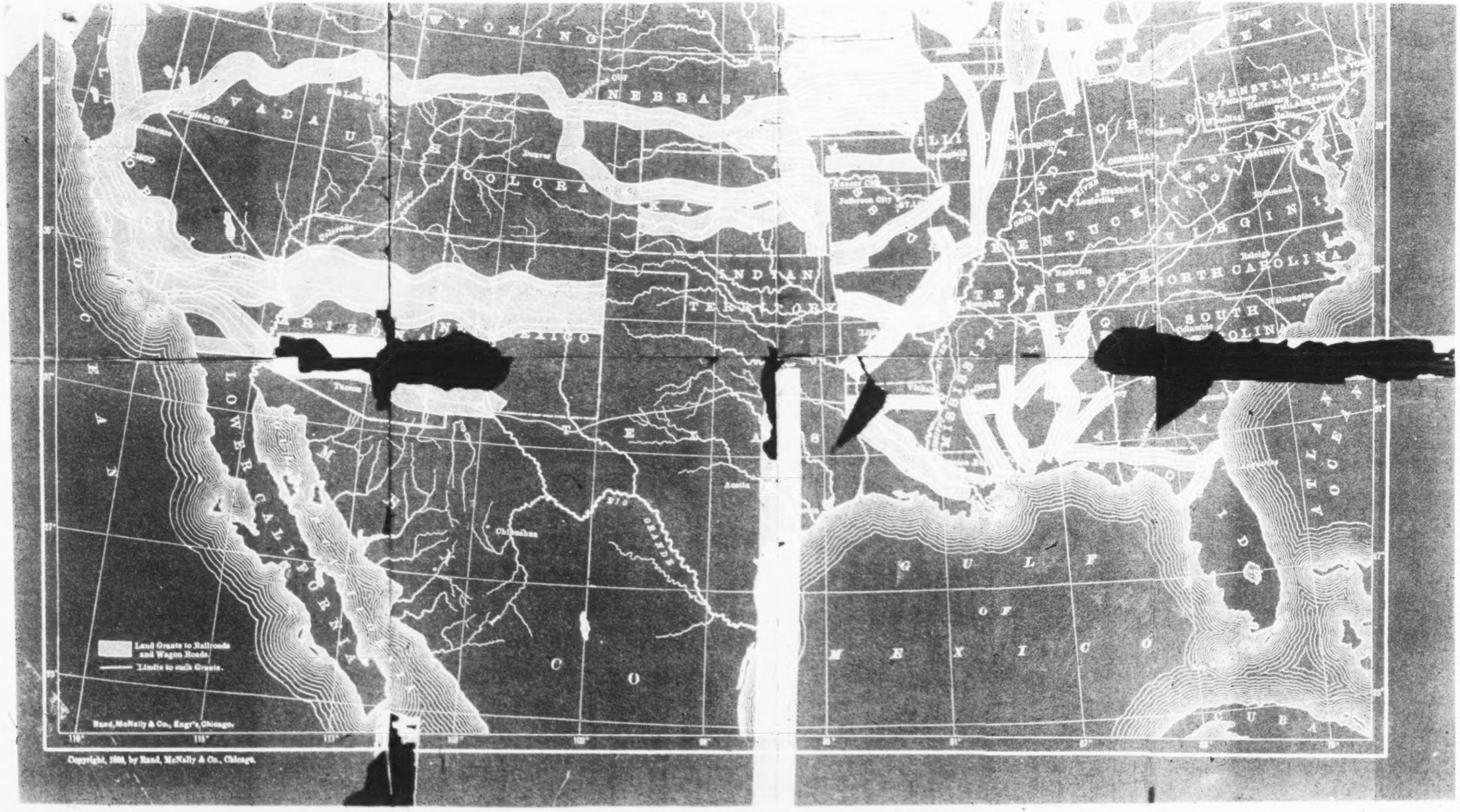
Yacht 819, 942
Yellowstone Lake 426
Yellowstone National Park 421, 423, 426, 426
Yosemite Valley 405
Young, Brigham 441, 445

Z

Zinc 162, 220, 230, 290, 511, 523
"Zion's Co-operative Mercantile Institution" 441

LAND GRANTS TO RAILROADS [illegible] WAGON ROADS.




WYOMING
NEBRASKA
COLORADO
UTAH
NEVADA
ARIZONA
NEW MEXICO
INDIAN TERRITORY
TEXAS
ILLINOIS
MISSOURI
KENTUCKY
TENNESSEE
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
PENNSYLVANIA
OHIO
Salt Lake City
Denver
Colorado
Kansas City
Jefferson City
St. Louis
Cairo
Louisville
Nashville
Raleigh
Wilmington
Richmond
Harrisburg
Philadelphia
Pittsburg
Wheeling
Columbus
Austin
Chihuahua
RIO GRANDE
LOWER CALIFORNIA
GULF OF MEXICO
ATLANTIC OCEAN
CUBA
Land Grants to Railroads and Wagon Roads.
Limits to such Grants.
Rand, McNally & Co., Engr's, Chicago.
Copyright, 1880, by Rand, McNally & Co., Chicago.